N-Form

User Manual

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Chapter 1 Introduction

ABOUT THIS CHAPTER

This chapter introduces the N-Form™ product suite and presents an overview of the software modules.

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AN OVERVIEW OF THE N-FORM PRODUCT SUITE

The N-Form product suite is based on a client/server architecture. The N-Form server acts as the central network manager by discovering, polling, collecting, and storing data from ADTRAN devices on the network. The N-Form server is accessed and controlled from virtually any computer on the network by a Java™ client using the Java Runtime Environment (JRE) browser plugin. The Java client accesses a personalized web page that is set up and maintained automatically for each user. The N-Form client software is a Java based applet which is launched via a web server. The applet runs within any browser using the JRE plugin.

Figure 1 on pag e3 shows the basic components that make up the N-Form product suite and illustrates the way these components work together. In addition to the N-Form server and the basic N-Form client modules for user and server administration, the N-Form product suite consists of two client modules: N-Command and N-Spect. The N-Command client module has three parts: a Network Manager, an Element Manager, and an Event Viewer. The N-Spect module includes an automated Report Manager.

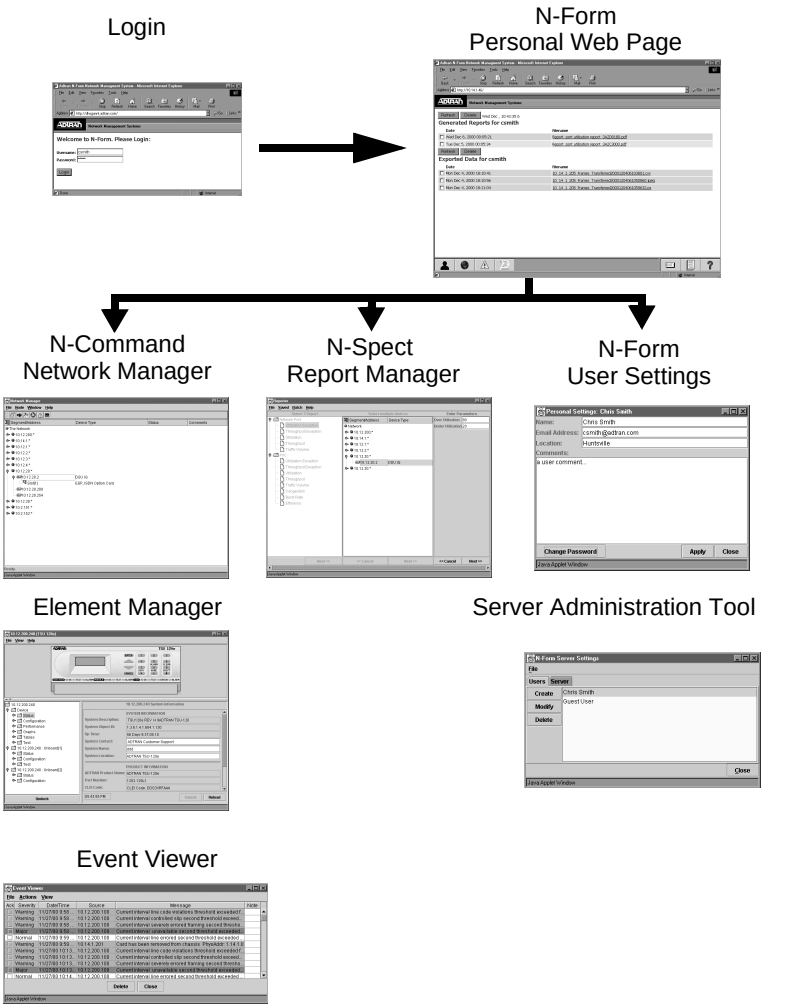

Figure 1. N-Form Product Suite Components

THE N-FORM TOOLS

User Administration Tool

The User Administration Tool allows users to change and update their user information and password.

Server Administration Tool

The Server Administration Tool allows the N-Form administrator to set up and manage users, groups, and to configure the N-Form Server. Each user is allowed exclusive access to his/her own data and reports.

THE N-COMMAND™ STRUCTURE

The N-Command client module is made up of three parts:

- Network Manager
- Element Manager
- Event Viewer

Network Manager

The Graphical User Interface (GUI) for the Network Manager is based on a hierarchical “tree” navigational structure. This topology tree interface allows at-a-glance high-level network health monitoring, with the ability to quickly drill down to detailed device configuration and real-time troubleshooting diagnostics. The Network Manager enables each device to send a message to an e-mail account or alphanumeric pager to alert users of high priority events.

N-Form uses a manually initiated discovery feature to quickly and accurately poll the entire network to locate all Simple Network Management Protocol (SNMP) accessible devices.
The discovery feature may be used to discover a single device, a subnet, or the entire network. Once initiated, the N-Form

discovery populates the topology tree with device types, names, and addresses. The Network Manager is discussed in greater detail in Chapter 3, *N-Command Network Manager*.

Element Manager

Once the Network Manager discovery is complete, the network devices may be configured and diagnosed using the N-Command Element Manager. The Element Manager is accessed from the Network Manager and displays a graphical representation of a device's front and back panels as you configure or diagnose the device. The program polls the device at regular intervals, allowing you to monitor the LEDs as you troubleshoot events. The Element Manager is discussed in greater detail in *Chapter 4, N-Command Element Manager*.

Event Viewer

The spread-sheet like interface for the Event Viewer displays the device name, address, time of event, event status, user-entered notes, and an acknowledgment field. The event information is color coded by event severity. The Event Viewer is discussed in greater detail in *Chapter 5, N-Command Event Viewer*.

N-SPECT™ REPORT MANAGER

The historical trend analysis tool is built around an intuitive GUI. The Report Manager creates easy-to-read reports based on user selections. Reports can be scheduled to run automatically at regular intervals based on a 24-hour day, business day, business week, calendar week, calendar month, quarter, or even calendar year. These scheduled reports are then published to individual users via their personalized web pages.

N-Spect includes a comprehensive set of reports illustrating network trends. Reports include exception-based reporting, point-to-point performance monitoring, and many others. The reports include a brief description of how to interpret the data and

any graphs or tables. Reports are preserved in Adobe Acrobat™ PDF format, allowing for reduced file size and web posting. The Report Manager is discussed in greater detail in *Chapter 6, N-Spect Report Manager*.

Chapter 2 Installing and Using N-Form

ABOUT THIS CHAPTER

This chapter presents the system requirements and procedures required to install and register the N-Form product suite.

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MINIMUM SYSTEM REQUIREMENTS

N-Form requires the following:

Server - Data Collection:

- Recommended Platforms:
  Pentium III (500MHz or higher)
- Operating Systems:
  Windows NT™ 4.0 with Service Pack 3
- 128 MB RAM
- 1 GB hard disk space
- CD-ROM drive for installation

Client - Network Configuration and Reports:

- 1024 x 768 display resolution
- Any hardware with Internet browser:
  Netscape Navigator™ (Version 4.76 or higher)
  Microsoft Internet Explorer™ (Version 5.5 or higher)
- Adobe Acrobat™ Reader (Version 4.05 or higher)
- Java Runtime Environment (JRE) (Version 1.3 or higher)

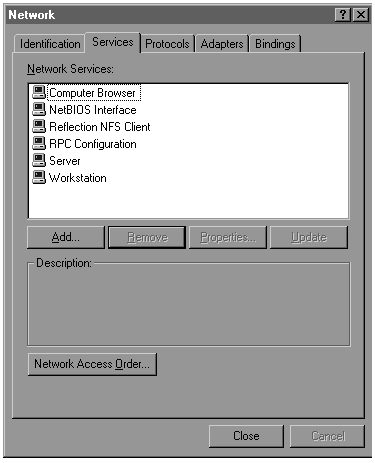
SNMP SETUP

If an SNMP server agent has not been installed on your computer, you must install it before installing N-Form. The N-Form setup program will determine whether this software is on the target computer and prompt the user to install it if necessary. The SNMP files are found on the Windows NT installation disks.

If you install SNMP from your Windows NT disks, the installation replaces some of the files that are updated by the required service packs. Therefore, it is necessary to reinstall the service pack following the SNMP installation.

❖ *Installing the SNMP Service*

1. From the Start Menu, choose **START > SETTINGS > CONTROL PANEL > NETWORK**.



2. Select the **SERVICES** tab.
3. Click **ADD**.
4. Select **SNMP SERVICE** from the list.
5. Click **OK** if the SNMP software exists on a local disk, or select **HAVE DISK** to load from the installation disks.
6. Reboot the computer.
7. Reinstall Service Pack 3 or greater.

INSTALLATION PROCEDURES

The N-Form installation CD-ROM contains the N-Form server and related software. The installation program copies the necessary files from the disk onto the user's hard drive. The program installs the Apache™ web server, Sybase Adaptive Server Anywhere™ database server, and ADTRAN N-Form server. The installation program gives the option of installing the database files and program files in different directories.

❖ *Installing the N-Form Server*

1. Insert the N-Form CD-ROM and wait for the installation program to autorun. To manually start the installation, from the Start Menu, choose **RUN** and type the drive letter of the CD-ROM followed by a colon; then type **setup.exe**. For example, if your CD-ROM has been assigned drive letter D, type **D:\setup.exe**.
2. Wait while the installation program checks for required software.

The installation program makes several checks to verify that your system is ready to install N-Form.

The program first checks to verify that the system has Windows NT Service Pack 3 or greater installed. Next the program verifies that the system has the SNMP services installed. If SNMP is not present, you must install it before installing N-Form (see instructions above). Finally, the program checks to see that the JRE is installed. If the JRE is not present, the program automatically starts the installation program for the JRE, and the user should follow the prompts to complete the installation. The user may cancel the JRE installation if desired, but the report generation features of the N-Form product suite will not be available.

3. Accept the licensing agreement.
4. Choose the destination folder.

The destination folder will contain the following installations required for the N-Form product suite:

- N-Form server executable and related files
- Apache web server version 1.3.12
- Perl™ version 5.6.0
- Sybase Adaptive Server Anywhere version 7.0

5. Choose the database destination folder.

The N-Form database consists of a single file called **nform.db**. This file will contain all the historical data stored by N-Form.

Optimal performance is achieved by installing the database on a local hard drive versus a networked hard drive.

6. Choose the database backup location.

The database backup location cannot be the same as the database destination. Choosing the same location for both databases will cause the backup to fail.

The user can choose to have the database automatically store a backup copy at this location each day. For better data security, this backup should be stored on a separate physical drive. For better performance, this backup should be stored on a local drive. The database will perform a full backup each day at the completion of data archiving. The backup will have the same name as the existing database: **nform.db**. Each day's full backup will replace the existing backup or create a new one if one does not exist. It is not necessary to stop the database server during backup, and the database remains available during the backup. However, querying the database slows the backup speed. If no queries are executing, the backup takes approximately the same time as a file copy between the database and backup location.

7. Wait while the installation program configures Perl.
8. Wait while the installation program configures Apache.
9. The installation program will now start the N-Form server and the Apache web server as Windows NT services.

The following Windows NT services are required by N-Form:

- ADTRAN N-Form Server
- Apache
- SNMP Trap Service

If you already have Apache installed, the existing files will be untouched, but the Apache service installed by N-Form will be started and will replace the existing service. If Apache is subsequently reinstalled, it will replace the service started by

N-Form. In other words, the most recently installed Apache service will run.

Other web servers can be installed along with N-Form; however, N-Form's Apache web server utilizes port 80 and any other installation using port 80 will interfere with the N-Form operation.

10. Wait while the Sybase database server is started by N-Form as a background application.

UNINSTALLATION PROCEDURES

The N-Form uninstallation script should be used if it is necessary to uninstall the N-Form server.

❖ *Uninstalling the N-Form Server*

1. Click on the link in the **START MENU > PROGRAMS > N-FORM** folder that reads **UNINSTALLING N-FORM**.
2. After the uninstallation is complete, if the UnInstallShield makes a **DETAILS** button active, click on it to display a list of files or folders that were not deleted.

Any files generated by N-Form, such as the database file and user reports, will not be deleted by the Uninstallation script. These files must be manually deleted by the user.

3. Delete any folders or files that may be left behind after the UnInstallShield is complete.

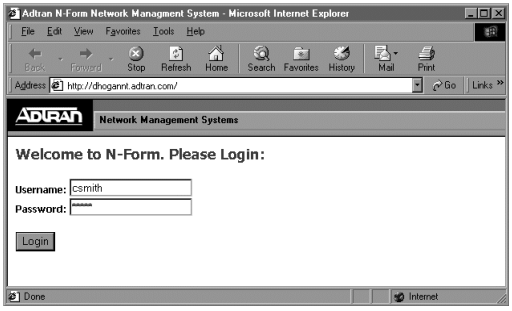
LOGIN PROCEDURES

The default user preconfigured with N-Form is the Administrator account with username “root” and default password “password”. This account may be used to set up additional users and perform other administrative tasks (see *Chapter 7, N-Form Administration*). When a new user is created by the N-Form Administrator, their default password is “password”. You may need to consult an N-Form Administrator for a username and password, as well as the address of the login page for your location.

❖ *Logging in to N-Form*

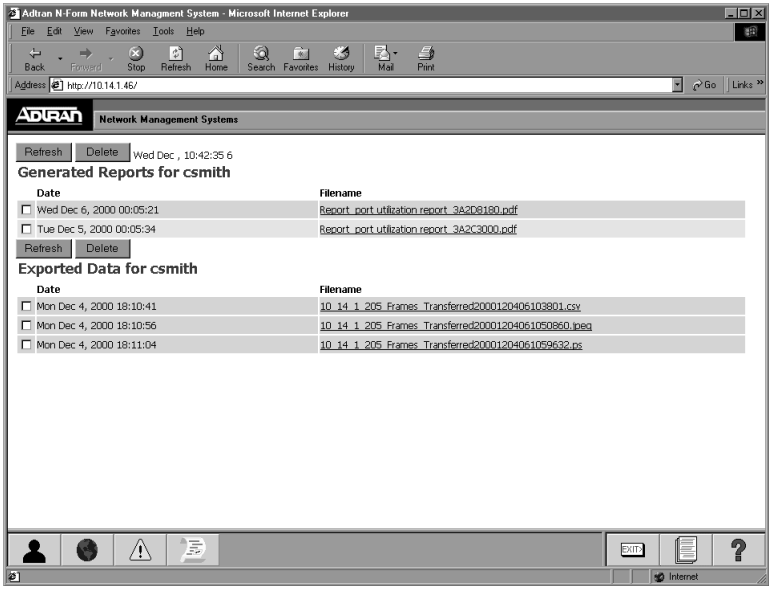
1. Open an N-Form compatible browser and point to the N-Form login page set up during installation. For more details on the browser requirements, please refer to *Minimum System Requirements* on page 8.

The login page appears.



2. Type your **USERNAME** and **PASSWORD**.
3. Click **LOGIN**.

The user personal web page appears.



PERSONAL WEB PAGE

The personal web page maintains a list of user-specific network reports and user exported data. The web page also allows the user to access any of the N-Form modules by clicking the buttons on the toolbar at the bottom of the screen. The buttons and their functions are listed below.

Starts the N-Form User Administration Tool. The User Administration Tool is discussed in *Chapter 7, N-Form Administration*.

Starts the N-Command Network Manager. The Network Manager is discussed in *Chapter 3, N-Command Network Manager*.

Starts the N-Command Event Viewer. The Event Viewer is discussed in *Chapter 5, N-Command Event Viewer*.

Starts the N-Spect Report Manager. The N-Spect Report Manager is discussed in *Chapter 6, N-Spect Report Manager*.

Starts the N-Form Server Administration Tool. The N-Form Server Administration Tool is discussed in *Chapter 7, N-Form Administration*.

Exits the N-Form personal web page and returns to the N-Form login screen. The N-Form personal web page is discussed in *Chapter 2, Installing and Using N-Form*.

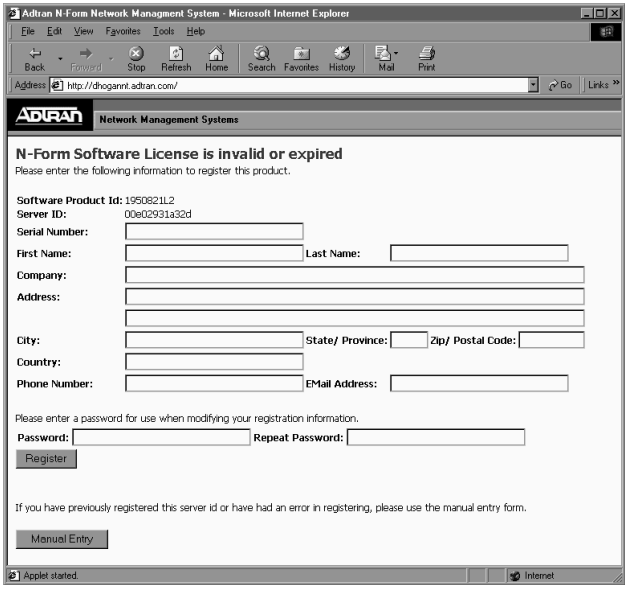
Opens the online help document for the N-Form product suite.

Opens a browser window that contains links to download necessary N-Form client components and patches for various platforms.

N-FORM REGISTRATION

N-Form includes a trial license which enables the software for 30 days from the time of installation. After the trial period has expired, N-Form must be registered to obtain a permanent license key.

After the trial period has expired, a non-administrator user is prevented from logging in and presented with a message explaining that the N-Form software license is invalid or expired and asking them to contact their N-Form administrator. Any user with administrator privileges will see the registration screen shown below and must complete the registration before logging in.

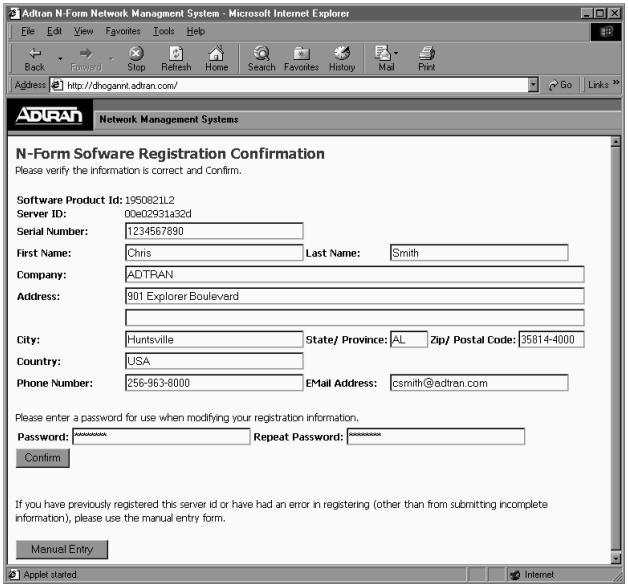


If some problem prevents the registration process from completing successfully, the administrator can call ADTRAN Technical Support to obtain a temporary license key that will provide another 30 day license.

❖ *Registering N-Form*

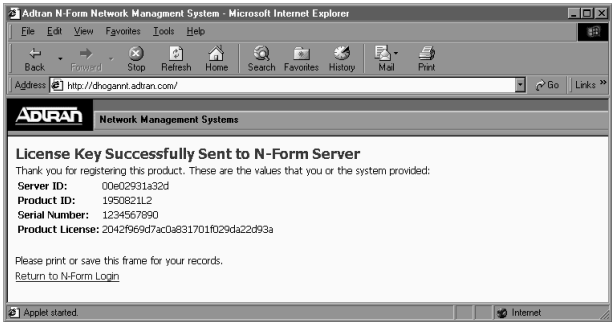
1. Fill in all the required information on the registration page (see previous page), and click **REGISTER**.

The N-Form Software Registration Confirmation screen appears, displaying the completed information.


Adtran N-Form Network Managment System - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print
Address http://dhogannt.adtran.com/
Go Links
ADTRAN
Network Management Systems
N-Form Sofware Registration Confirmation
Please verify the information is correct and Confirm.
Software Product Id: 1950821L2
Server ID: 00e02931a32d
Serial Number: 1234567890
First Name: Chris
Last Name: Smith
Company: ADTRAN
Address: 901 Explorer Boulevard
City: Huntsville
State/ Province: AL
Zip/ Postal Code: 35814-4000
Country: USA
Phone Number: 256-963-8000
EMail Address: csmith@adtran.com
Please enter a password for use when modifying your registration information.
Password:
Repeat Password:
Confirm
If you have previously registered this server id or have had an error in registering (other than from submitting incomplete information), please use the manual entry form.
Manual Entry
Applet started.
Internet

2. Verify the information and click **CONFIRM**.

The registration process retrieves a license key and stores the key in the local N-Form database. The registration information and the license key are displayed on the successful registration page.


Adtran N-Form Network Managment System - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print
Address http://dhogannt.adtran.com/
Go Links
ADTRAN
Network Management Systems
License Key Successfully Sent to N-Form Server
Thank you for registering this product. These are the values that you or the system provided:
Server ID: 00e02931a32d
Product ID: 1950821L2
Serial Number: 1234567890
Product License: 2042f969d7ac0a831701f029da22d93a
Please print or save this frame for your records.
Return to N-Form Login
Applet started.
Internet

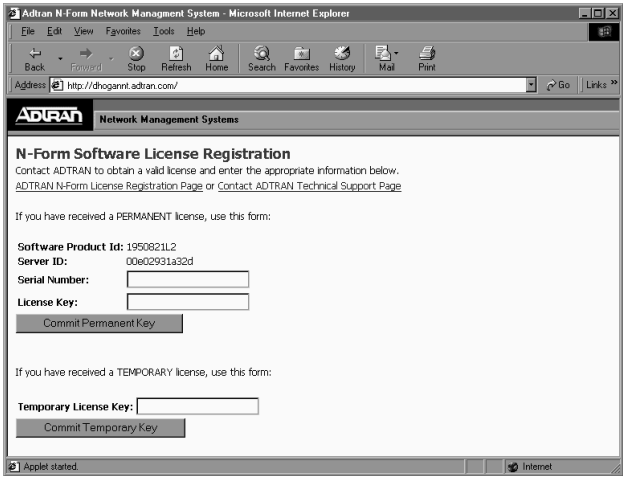
3. Print this information and save it for future reference.

The registration process described above automatically generates the license key and places it in the local database. The administrator may also manually register N-Form. If N-Form has previously been registered but needs to be re-registered because, for instance, the database file containing the license key has been deleted or damaged, or if the administrator wishes to manually generate a license key, the administrator must manually register N-Form.

❖ *Manually Registering N-Form*

1. On the registration page, click **MANUAL ENTRY.**

The manual registration page appears.


Adtran N-Form Network Managment System - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print
Address http://dhogannt.adtran.com/
Go Links
ADTRAN
Network Management Systems
N-Form Software License Registration
Contact ADTRAN to obtain a valid license and enter the appropriate information below.
ADTRAN N-Form License Registration Page or Contact ADTRAN Technical Support Page
If you have received a PERMANENT license, use this form:
Software Product Id: 1950821L2
Server ID: 00e02931a32d
Serial Number:
License Key:
Commit Permanent Key
If you have received a TEMPORARY license, use this form:
Temporary License Key:
Commit Temporary Key
Applet started.
Internet

2. Enter the required information.

   If N-Form has previously been registered, enter the serial number and the license key shown on the original confirmation page from your records, or enter the serial number and a manually generated license key (see *Manually Generating a License Key* below).

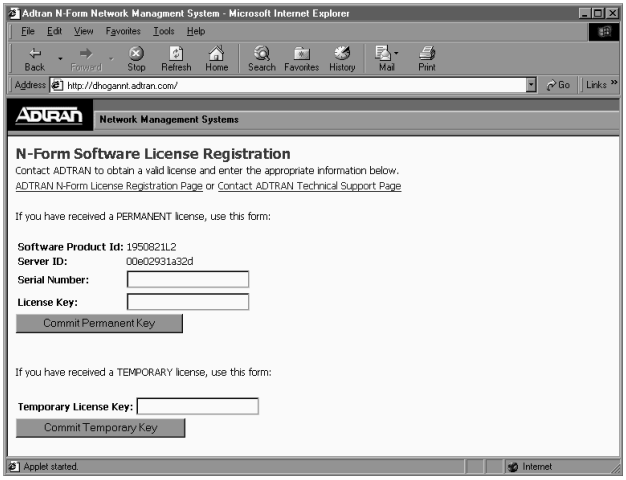
   If you have been assigned a temporary license key by ADTRAN Technical Support, enter it in the space provided.

3. Click **COMMIT PERMANENT KEY** to permanently activate the software, or click **COMMIT TEMPORARY KEY** to activate another 30 day license.

❖ *Manually Generating a License Key*

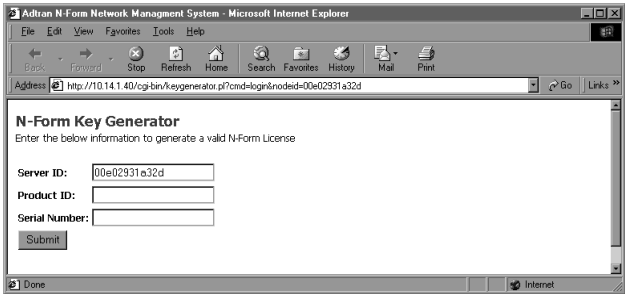
1. Click **MANUAL ENTRY** on the main registration screen (shown on previous page).

The manual registration page appears.


Adtran N-Form Network Managment System - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print
Address http://dhogannt.adtran.com/
Go Links
ADTRAN
Network Management Systems
N-Form Software License Registration
Contact ADTRAN to obtain a valid license and enter the appropriate information below.
ADTRAN N-Form License Registration Page or Contact ADTRAN Technical Support Page
If you have received a PERMANENT license, use this form:
Software Product Id: 1950821L2
Server ID: 00e02931a32d
Serial Number:
License Key:
Commit Permanent Key
If you have received a TEMPORARY license, use this form:
Temporary License Key:
Commit Temporary Key
Applet started.
Internet

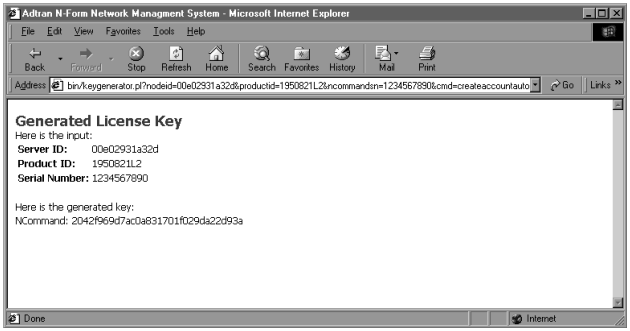
2. Click on the ADTRAN N-Form License Registration Page hyperlink.

The N-Form Key Generator page appears.


Adtran N-Form Network Managment System - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print
Address http://10.14.1.40/cgi-bin/keygenerator.pl?cmd=login&nodeid=00e02931a32d
Go Links
N-Form Key Generator
Enter the below information to generate a valid N-Form License
Server ID: 00e02931a32d
Product ID:
Serial Number:
Submit
Done
Internet

3. Enter the required information and click **SUBMIT**.

The page returns the license key.



4. Print this information and save it for future reference.

Chapter 3 N-Command Network Manager

ABOUT THIS CHAPTER

This chapter describes the N-Command Network Manager.

CONTENTS

Topic	Page
Network Manager	22
Searching for a Node in the Network Map	24
Editing Device Attributes	30
Event Notification by Email	31
Telnet	34
Data Collection	35

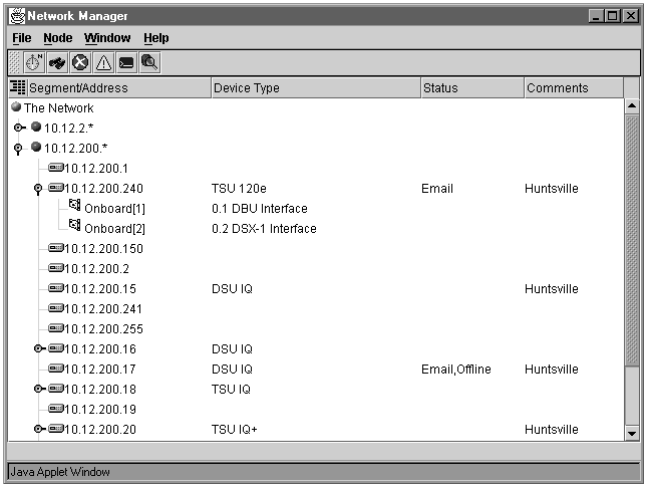
NETWORK MANAGER

The GUI for the Network Manager is based on a hierarchical "tree" navigational structure. This topology tree interface allows at-a-glance high-level network health monitoring with the ability to quickly drill down to detailed device configuration and real-time troubleshooting diagnostics.

❖ *Starting the N-Command Network Manager*

1. Log on to your personal N-Form web site.
2. Click the **NETWORK MANAGER** button on the toolbar at the bottom of the screen.

A Network Manager appears.



Information about the discovered network segments is displayed in four columns in the Network Manager.

- **SEGMENT/ADDRESS** - The address of the network device, displayed as a domain name or IP address. Network segments are represented by an IP address with an asterisk (10.12.1.*).

- **DEVICE TYPE** - ADTRAN products for which there are N-Form models are displayed by their product name (such as TSU IQ).

ADTRAN products that have not been modeled and non-ADTRAN devices have no **DEVICE TYPE** listed.

- **STATUS** - Displays whether the device is **OFFLINE** or has **EMAIL** notification assigned to it.

- **COMMENTS** - User comments such as the device's physical location.

The tree structure can be explored by selecting the switches to the left of the node icons to expand or close a segment of the network. The network is expanded to reveal nodes, the nodes are expanded to reveal individual devices, and the devices are expanded to reveal accessory cards. The tree structure can also be completely expanded or collapsed by selecting **WINDOW > EXPAND ENTIRE TREE** or **WINDOW > COLLAPSE ENTIRE TREE**. The tree is updated automatically to reflect the current state of the network. The tree can be refreshed manually by choosing **WINDOW > RELOAD TREE**.

The current display state of each node in the network map may be manually saved at any time by the user. This saved display state can then be restored, allowing the user to view a particular part of the network map without having to navigate back to the same display state each time they log in.

The network map can be filtered to display only ADTRAN devices by selecting **WINDOW > VIEW ADTRAN DEVICES**. Once this option is selected, the menu item becomes **WINDOW > VIEW ALL DEVICES** and is used to switch back to the all device view. When switching between ADTRAN only and all device views, the last stored display state for each view is restored.

❖ *Saving/Restoring the State of the Network Map Device Tree*

1. Choose **FILE > SAVE SETTINGS** to save a state, or choose **FILE > RESTORE SETTINGS** to restore from a saved state.

Four menus appear at the top of the Network Manager screen. Below the menus is a toolbar containing shortcuts to the most frequently used functions. The tool bar may be repositioned by

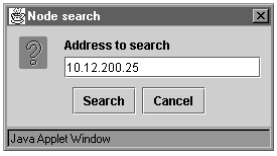
dragging the knurled handle on the leftmost end of the bar. The toolbar may be anchored horizontally or vertically on the top/bottom or left/right side of the window, or it may be unlocked and positioned anywhere on the screen.

❖ *Searching for a Node in the Network Map*

This feature allows the user to search for a particular address in the network map. The search dialog can be accessed two ways, described in the steps below.

1. Click the **SEARCH** button on the toolbar, or choose **NODE > SEARCH**.

The Node search dialog appears.



2. Type in the IP address or name you wish to search for and click **SEARCH**.

The network map will open to display the desired address if it is available.

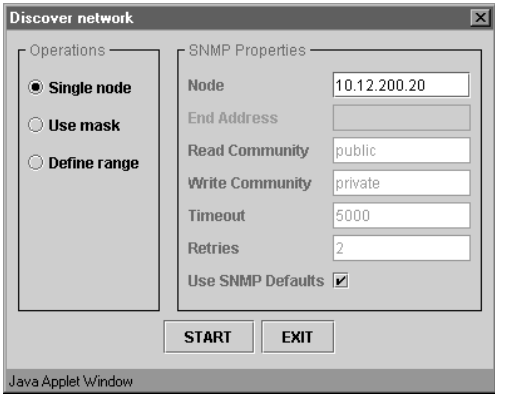
DISCOVERY

N-Form's discovery feature polls the network to seek and find SNMP accessible devices. N-Form can discover a single device given the device address, a range of devices given a starting device address and ending device address, or a subnet given the subnet address and subnet mask. N-Form's discovery populates the network map with the address, device type, name, and current status of each device. The user may predefine SNMP properties to be used during discovery in order to discover devices which have non-default SNMP properties (such as read community, write community names, timeout and retry values).

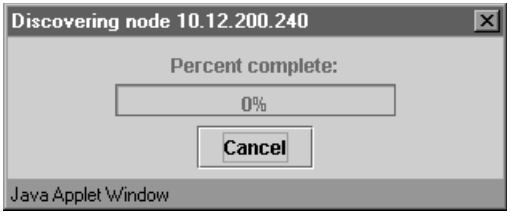
To speed the device discovery process, multiple devices may be discovered simultaneously. The default value is 32 and the values range from 1 to 64. However, adding additional simultaneous discoveries also increases the amount of network bandwidth consumed by the discovery process. There will be some point beyond which the additional network traffic caused by adding additional discoveries will offset any speed gain. The number of simultaneous discoveries is set by the Server Administrator (see *Chapter 7, N-Form Administration*).

❖ *Discovering a Single New Device*

1. Select **THE NETWORK** at the top of the network map.
2. Click the **DISCOVER** button on the toolbar or choose **NODE > DISCOVER**. The Discovery dialog appears.



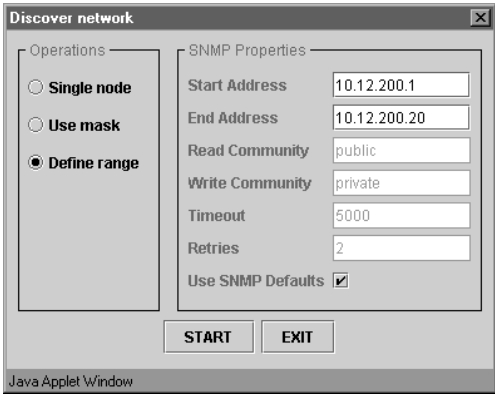
3. Select the **SINGLE NODE** radio button.
4. Select the **USE SNMP DEFAULTS** checkbox or enter SNMP properties.
5. Enter the address for the single device in the **NODE** entry field.
6. Click **START**. The Discovery status dialog appears.



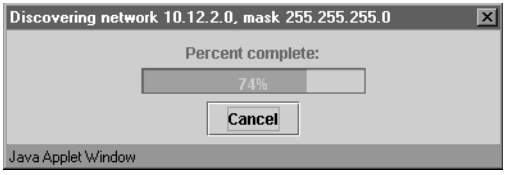
The Discovery status dialog displays the progress of the discovery. A status bar at the bottom of the Network Manager indicates that a discovery is running and shows the number of simultaneous discoveries being used. When a discovery is complete, the requested device dynamically appears in the network map. See *Chapter 7, N-Form Administration*, for more information on configuring the number of simultaneous discoveries to use for the discovery process.

❖ *Discovering a Range of Devices*

1. Select **THE NETWORK** at the top of the network map.
2. Click the **DISCOVER** button on the toolbar or choose **NODE > DISCOVER**. The Discovery dialog appears.



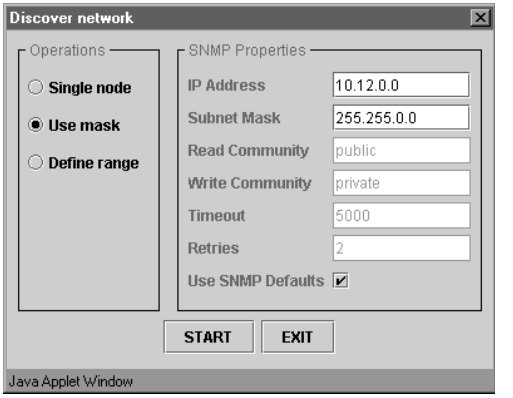
3. Select the **DEFINE RANGE** radio button.
4. Select the **USE SNMP DEFAULTS** checkbox or enter SNMP properties.
5. Enter **START ADDRESS**.
6. Enter **END ADDRESS**.
7. Click **START**. The Discovery status dialog appears.



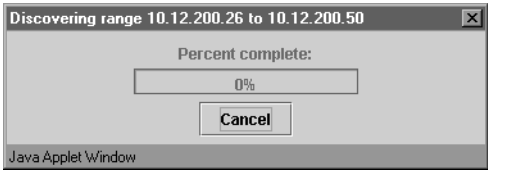
The Discovery status dialog displays the progress of the discovery. A status bar at the bottom of the Network Manager indicates that a discovery is running and shows the number of simultaneous discoveries being used. When a discovery is complete, the requested devices dynamically appear in the network map. See *Chapter 7, N-Form Administration*, for more information on configuring the number of simultaneous discoveries to use for the discovery process.

❖ *Discovering an Entire Subnet*

1. Select **THE NETWORK** at the top of the network map.
2. Click the **DISCOVER** button on the toolbar or choose **NODE > DISCOVER**. The Discovery dialog appears.



3. Select **USE MASK**.
4. Enter **IP ADDRESS**. This is the IP address of the subnet you wish to discover.
5. Enter **SUBNET MASK**.
6. Select the **USE SNMP DEFAULTS** checkbox or enter SNMP properties.
7. Click **START**. The Discovery status dialog appears.

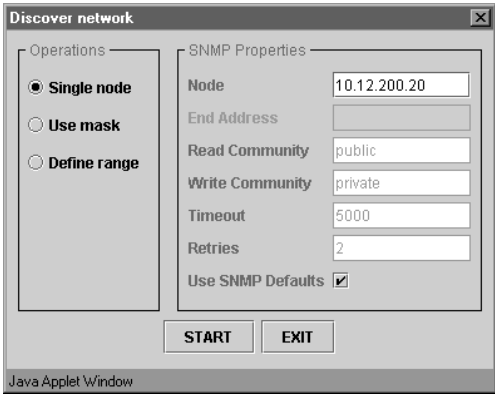


The Discovery status dialog displays the progress of the discovery. A status bar at the bottom of the Network Manager indicates that a discovery is running and shows the number of simultaneous discoveries being used. When a discovery is complete, the requested subnet and all corresponding devices dynamically appear in the network map. See *Chapter 7, N-Form Administration*, for more information on configuring the number of simultaneous discoveries to use for the discovery process.

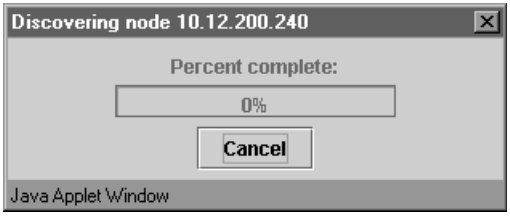
❖ *Rediscovering a Node*

1. Select a node in the network map.
2. Click the **DISCOVER** button on the toolbar or choose **NODE > DISCOVER.**

The Discovery dialog appears with the required **OPERATIONS** and **SNMP PROPERTIES** for the selected device filled in.

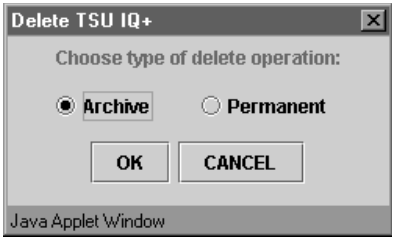


3. Click **START**. The Discovery status dialog appears.



❖ *Deleting a Node from the Device Map*

1. Select a node.
2. Click the **DELETE** button on the toolbar or choose **NODE > DELETE**. The Delete dialog appears.



3. Select the delete option **ARCHIVE** or **PERMANENT** button.

The delete **PERMANENT** option removes the node from the network map and also removes any data stored in the database for that node. The delete **ARCHIVE** option removes the node from the network map but retains any collected data in the database. The node can then be rediscovered and N-Form will automatically resume adding to the data already saved in the database.

4. Click **OK**.

The node is instantly removed from the map. All connected clients will see the deletion dynamically occur.

EDITING DEVICE ATTRIBUTES

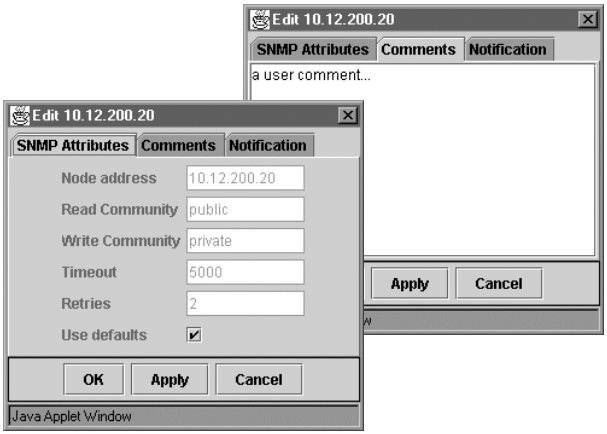
N-Command allows the user to configure the SNMP properties (read/write communities, timeout in milliseconds and retries) and enter user comments for each device. These properties enable the server to communicate with each device using SNMP.

❖ *Editing the Attributes of a Device*

1. Select the device.

2. Click the **EDIT** button on the toolbar or choose **NODE > EDIT**.

The Edit Device dialog appears.



3. Click the **SNMP ATTRIBUTES** tab to modify SNMP properties. Uncheck the **USE DEFAULTS** checkbox to specify new values for this device. The default values may be changed by the server administrator (see *Chapter 7, N-Form Administration*).
4. Click the **COMMENTS** tab to add or change a user comment.
5. Click **APPLY** to enter changes and continue editing, or click **OK** to enter changes and exit.

EVENT NOTIFICATION BY EMAIL

The N-Form Network Manager can configure each node to notify specified users via email when events are encountered. Different users can be specified to receive notification of events of different severity levels, and a severity level can be assigned to each network node. Consider a device which is part of a subnet, which is part of the network. The device level events can be designated as minor severity, subnet events can be designated as major severity, and network level events can be designated as critical severity. A single user might wish to receive notification of events from the specific device, but may not be concerned with other events. Other users might need to be notified of events from a particular subnet only. The network manager may be notified of

events from the entire network. Notification for events from the entire network must be configured in the Administration Tool (see *Chapter 7, N-Form Administration*).

Event notification severity falls through to each higher level of criticality. For example, a user who receives minor severity events would also be notified of events of major and critical severity, but a user who only receives critical severity events would not be notified of events with lesser severity.

Email notification is dependent on the network's local mail server. Some servers are configured to send email only inside their local domain, and N-Form event notification would therefore have the same limitation. The N-Form mail server is configured in the Server Administration Tool (see *Chapter 7, N-Form Administration*).

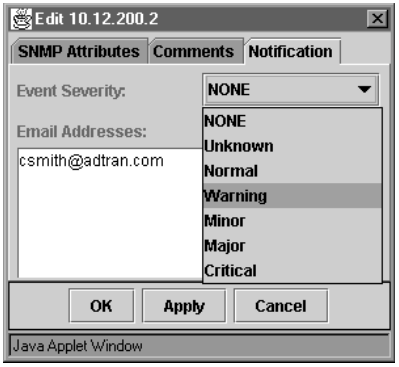
❖ *Configuring Event Notification*

1. Select the node.

2a. Choose **NODE > EDIT**.

Alternately,

2b. Right click on a device and choose **EDIT** from the popup menu. The Edit dialog appears.



3. Click the **NOTIFICATION** tab.

4. Select the notification **EVENT SEVERITY** level from the drop down menu:

   NONE
   UNKNOWN
   NORMAL
   WARNING
   MINOR
   MAJOR
   CRITICAL

5. Enter valid **EMAIL ADDRESSES** in the panel below the severity menu.

These email addresses can be in any form accepted by the local mail server. In addition to the typical user@domain form, some email servers are set up to accept just the username or other aliases to represent users and groups of users. Refer to your email server documentation for clarification of accepted address forms.

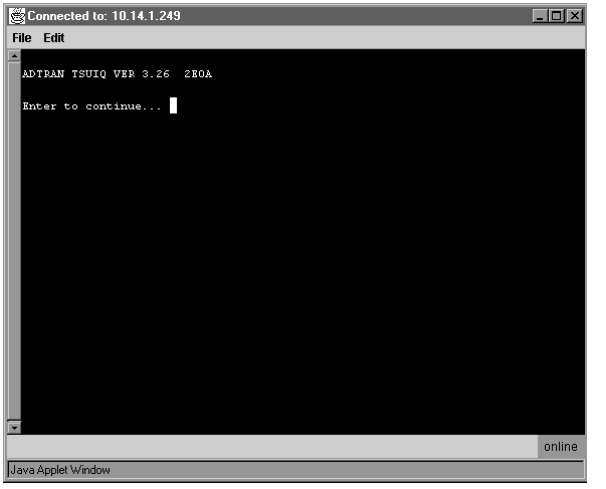
6. Click **APPLY** to enter changes and continue editing, or click **OK** to enter changes and exit.

TELNET

N-Form facilitates telnet access to any device which is telnet capable. Access is accomplished by ‘tunneling’ through the server to the device. Multiple telnet sessions may be invoked simultaneously.

❖ *Opening a Telnet Session to a Selected Device*

1. Select a telnet capable device in the network map.
2. Click the **TELNET** button on the toolbar or choose **NODE > TELNET**. A telnet login screen for the device appears.



3. Enter the **PASSWORD** for the selected device.

DATA COLLECTION

The N-Form server automatically collects performance data stored in the devices in the network map and stores the data in the N-Form database. This data collection occurs at one or more automatically scheduled times during the day, depending on the configuration of each particular device. This data collection is discussed in greater detail in *Chapter 6, N-Spect Report Manager*. The Report Manager cannot generate or schedule a report for a device until that device has data in the database. If the user wants to schedule a report immediately for a device which has just been discovered, they must manually force a data collection on that device. This forced collection will not affect the automatically scheduled data collection time. N-Form stores the time of each collection in the database and only collects the data stored in the device since its last collection time; therefore the forced collection will not cause any duplication of data in the database.

❖ *Forcing the Collection of a Selected Device*

1. Select a device in the network map.
2. Select **NODE > COLLECT DATA.**

Chapter 4 N-Command Element Manager

ABOUT THIS CHAPTER

This chapter describes the N-Command Element Manager.

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N-COMMAND ELEMENT MANAGER

Once the Network Manager discovery is complete, the network devices may be configured and diagnosed using the N-Command Element Manager. The Element Manager polls the devices at regular intervals for their latest configuration and status data. As each device is configured or diagnosed, the Element Manager displays a graphical representation of the appropriate front and rear panels, showing the current state of status LEDs and installed option cards. The user can modify any SNMP updateable configuration parameter and view the data stored in the device.

The Element Manager is accessed from within the Network Manager and may be started four different ways.

❖ *Starting the Element Manager*

1. Select a device to view from the network map.

2a. Right-click the selected device and choose **VIEW** from the popup menu.

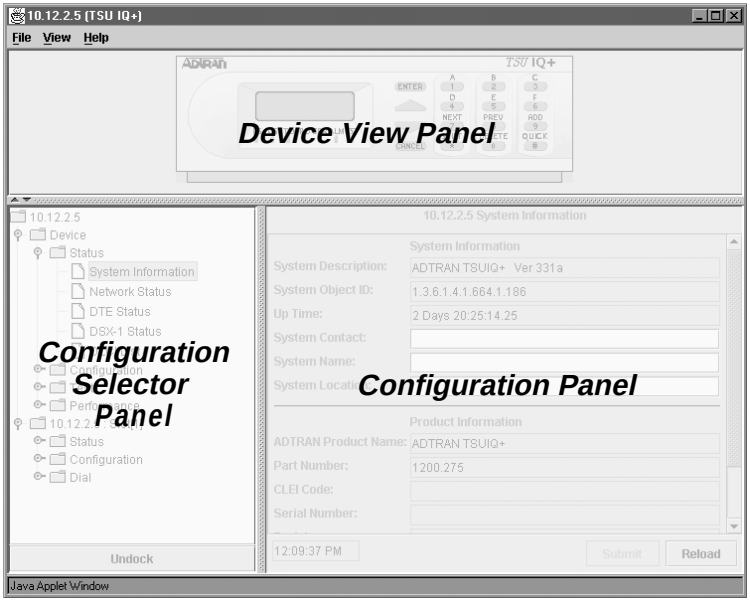
Alternately:

2b. Click the **VIEW** button on the toolbar.

2c. Choose **NODE** > **VIEW**.

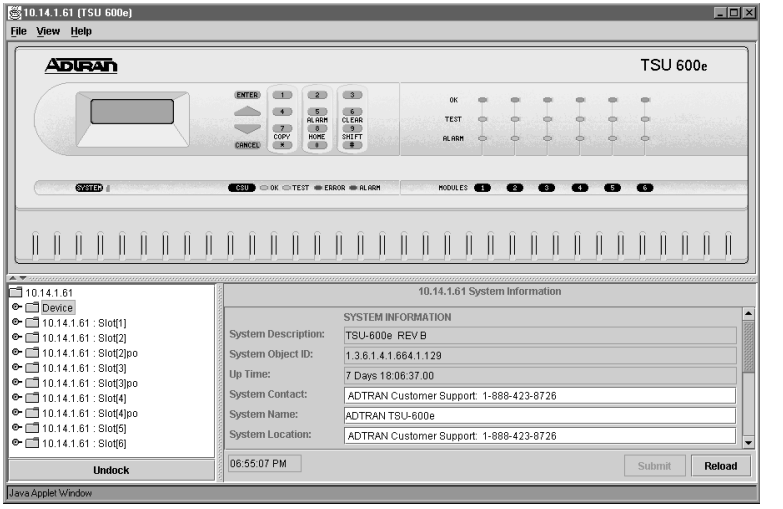
2d. Double-click the device on the network map.

An Element Manager appears.



The Element Manager contains three panels. The upper device view panel shows a graphical representation of the selected device. The left configuration selector panel shows an expandable tree of information about the selected device. The device name (or IP address if not defined in the Domain Name Server) appears at the top of the tree. Below the name are expandable “folders” of information about the selected device. The folders vary depending on the device type and installed options. As the folders are expanded and a configuration selector is chosen, the corresponding information is displayed in the right configuration panel. Each configuration panel may be undocked by clicking the **UNDOCK** button below the folder list on the left and moved anywhere on the screen, thus freeing the right panel to display additional information.

On devices that contain multiple slots for expansion, the status and configuration information for the option card in each slot appears in a separate folder in the configuration selector panel as shown below.



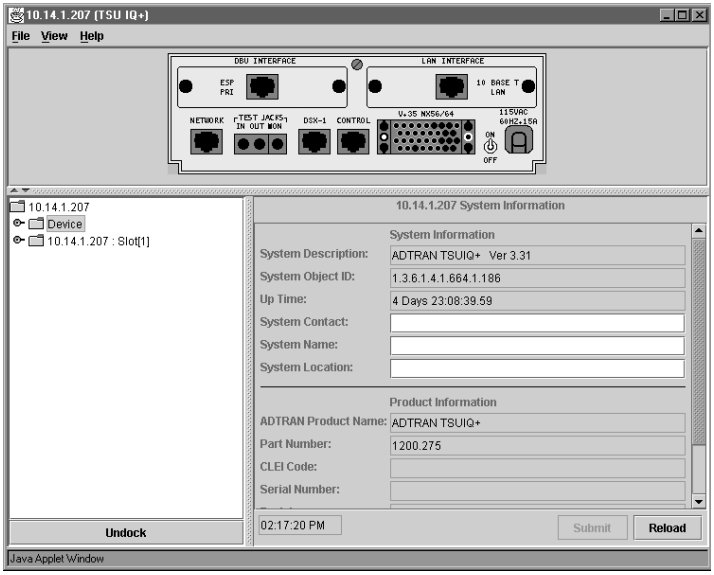
VIEWING A DEVICE

The device view panel shows a graphical representation of the selected device. The view shows the front and rear of the device, LED status changes, and installed option cards. The Element Manager automatically polls the selected ADTRAN device at regular intervals. When the device is polled, the status LEDs on the device view match the status LEDs on the actual device.

❖ *Viewing the Back of a Device*

1. Select **VIEW** > **REAR**.

The rear view of the selected device is shown and installed option cards are visible as shown below.



STATUS POLLING

The Element Manager automatically polls the selected ADTRAN device at regular intervals. It can also poll an ADTRAN device on demand.

❖ *Polling a Device on Demand*

1. Select a device and start the element manager.
2. Select a data folder in the configuration selector panel to open in the configuration panel.
3. Select the **POLL** button on status only configuration panels, or select **RELOAD** on updateable configuration panels.

Polling the device returns and updates the status and configuration fields. The time for the last device poll is shown in the lower left of the configuration panel. If a poll attempt fails, the time field is shown in red and remains red until the next successful poll.

CONFIGURING A DEVICE

The Element Manager can be used to configure ADTRAN devices connected to the network.

❖ *Configuring a Device*

1. Select a device and start an Element Manager.
2. Select a data folder in the configuration selector panel to open in the configuration panel.
3. Modify desired configuration data.
4. Click **SUBMIT** to update the configuration or **RELOAD** to dismiss changes and reload the existing configuration.

CHARTS AND TABLES

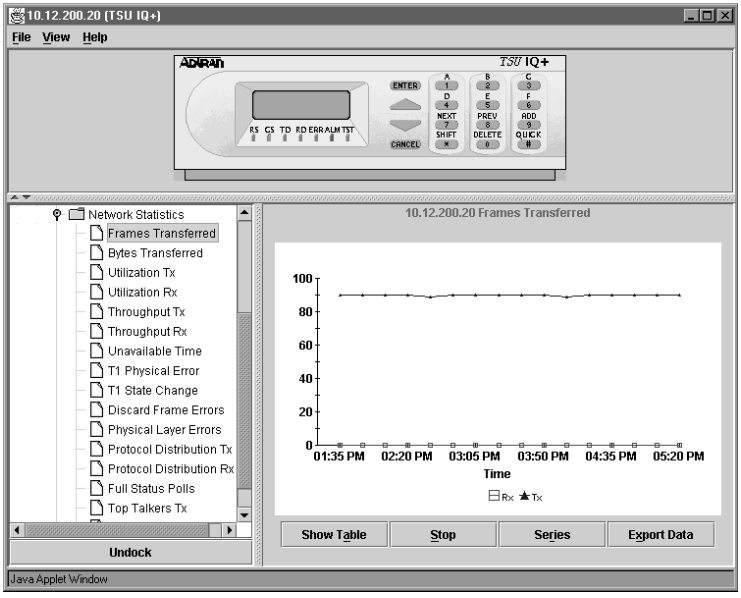
The charts and tables produced by the Element Manger are distinguished from the reports produced by the Report Manager in that they use data directly from the selected devices. The Report Manager produces reports using data from the database.

❖ *Viewing Charts and Tables*

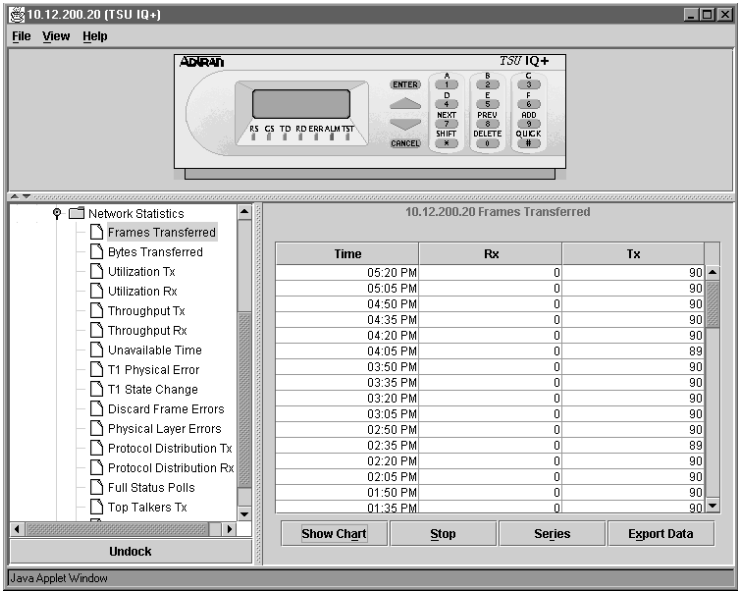
1. Select a device in the network map.
2. Open an Element Manager.
3. Select a chart or table from the configuration selector panel.

   Each chart or table is displayed in the configuration panel. If a device has multiple PVCs, a drop down menu appears at the top of the configuration panel and data is displayed for the PVC chosen.

As you move the mouse over the plot, the x and y coordinates of each point are displayed.



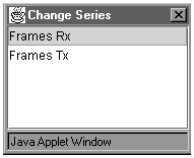
4. Click **SHOW TABLE** to display the data in tabular form.



All charts may also be displayed as tabular data; however, information originally in tabular form cannot be shown as a chart.

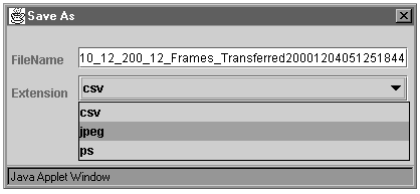
5. Click **STOP** to stop updating the chart.
6. Click **SERIES** to modify the number of data series plotted in the chart.

   The Change Series dialog appears.



7. Select the series you wish to display. Control Click or shift click to select multiple series.
8. Click **SAVE AS** to save the data currently plotted in the chart to a file.

The Save As dialog appears.



9. Choose a file type from the dropdown menu:

   CSV - comma separated values, text only format
   JPEG - graphical image format
   PS - postscript, graphical image format

10. Click **OK** to accept the autogenerated unique filename, or enter a filename and click **OK**.

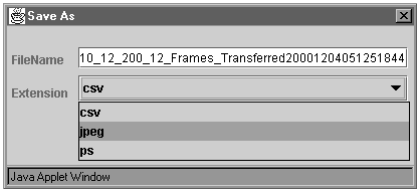
    The file is saved on the N-Form server and appears in the Exported Data section on the user's personal web page. The file is accessed by clicking on the filename hyperlink on the web page. The file is opened in a browser window for viewing and may be saved to the user's computer using the browser's **SAVE** or **SAVE AS** functions.

Right-Click on the plot for additional display and export options.

11. Choose **DISPLAY AS...** from the popup menu to alter the chart type. Choose the desired chart type from the available options:

    LINE CHART
    AREA CHART
    BAR CHART
    STACKING BAR CHART

12. Choose **SAVE AS** from the popup menu to export the chart. The Save As dialog appears.



13. Choose a file type from the dropdown menu:

    CSV - comma separated values, text only format
    JPEG - graphical image format
    PS - postscript, graphical image format

14. Click **OK** to accept the autogenerated unique filename, or enter a filename and click **OK**.

15. Drag over an area of the plot to zoom in on the selected region. Choose **RESET CHART** from the popup menu to restore the original chart view.

Chapter 5 N-Command Event Viewer

ABOUT THIS CHAPTER

This chapter describes the N-Form Event Viewer.

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EVENT VIEWER

N-Form records all events and standard alarms such as receive yellow alarm, transmit yellow alarm, receive blue alarm, transmit blue alarm, red alarm, loss of signal, and loopback. Events are distinguished from traps in that they may represent a system level event for a node that does not normally send traps. These events are dynamically displayed using the N-Command Event Viewer. The events may be acknowledged by any client, and user comments may be attached to each individual event. All connected clients see event acknowledgments and updated comments dynamically.

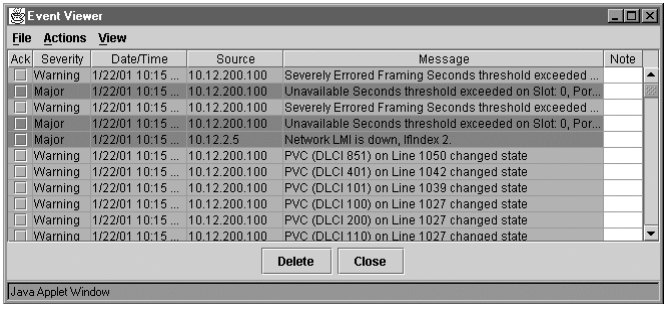
❖ *Starting the Event Viewer*

1. Log on to your personal N-Form web site.
2. Click the **EVENT VIEWER** button on the tool bar at the bottom of the screen.

The Event Viewer may also be started from within the Network Manager.

1. Start N-Command Network Manager.
2. Choose **NODE** > **EVENTS**

An Event Viewer appears.


Event Viewer
File Actions View
Ack Severity Date/Time Source Message Note
Warning 1/22/01 10:15 ... 10.12.200.100 Severely Errored Framing Seconds threshold exceeded ...
Major 1/22/01 10:15 ... 10.12.200.100 Unavailable Seconds threshold exceeded on Slot: 0, Por...
Warning 1/22/01 10:15 ... 10.12.200.100 Severely Errored Framing Seconds threshold exceeded ...
Major 1/22/01 10:15 ... 10.12.200.100 Unavailable Seconds threshold exceeded on Slot: 0, Por...
Major 1/22/01 10:15 ... 10.12.2.5 Network LMI is down, ifIndex 2.
Warning 1/22/01 10:15 ... 10.12.200.100 PVC (DLCI 851) on Line 1050 changed state
Warning 1/22/01 10:15 ... 10.12.200.100 PVC (DLCI 401) on Line 1042 changed state
Warning 1/22/01 10:15 ... 10.12.200.100 PVC (DLCI 101) on Line 1039 changed state
Warning 1/22/01 10:15 ... 10.12.200.100 PVC (DLCI 100) on Line 1027 changed state
Warning 1/22/01 10:15 ... 10.12.200.100 PVC (DLCI 200) on Line 1027 changed state
Warning 1/22/01 10:15 ... 10.12.200.100 PVC (DLCI 110) on Line 1027 changed state
Delete
Close
Java Applet Window

By default, all network events of all severity levels appear in the Event Viewer. The Event Viewer has a flexible filtering feature

that allows the user to view the events for a single device or for selected severity levels.

❖ *Displaying Events for an Individual Node*

1. Select a node in the Network Manager.

2a. Click the **EVENTS** button in the toolbar or choose **NODE > EVENTS**

or

2b. Right click on the device and choose **EVENTS** from the popup menu.

Only events for the selected unit are displayed in the Event Viewer window.

❖ *Specifying Security Levels for Viewed Events*

1. Open an Event Viewer
2. Choose **VIEW > ALERT FILTER.** The Alert Filter dialog appears.

3. Click the check boxes to select the desired alert levels to view.
4. Click **OK**.

Only events of the selected alert levels will appear in the Event Viewer.

❖ *Sorting the Events List in the Event Viewer*

1. Start **EVENT VIEWER**.
2. Choose **ACTIONS > SORT** and choose a sort option from the list:

   MOST RECENT
   LEAST RECENT
   HIGHEST SEVERITY
   LOWEST SEVERITY
   ASCENDING NODE NAME
   DESCENDING NODE NAME
   ACKNOWLEDGMENT

❖ *Viewing Details about a Specific Event*

1. Open an Event Viewer.
2. Select a specific event and choose **VIEW > EVENT** or double click the specific event. The View Event Data dialog appears.

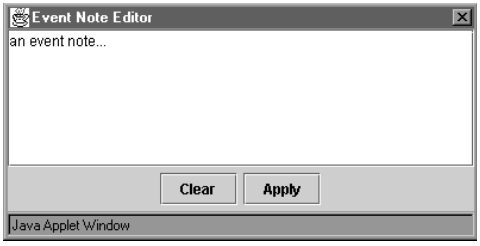
❖ *Deleting an Event for a Node*

1. Select an event in the Event Viewer or choose **ACTIONS > SELECT ALL** to select all events.
2. Click **DELETE** or choose **ACTIONS > DELETE**.

The selected event is cleared from the Events Viewer window. All connected clients will see the event deleted.

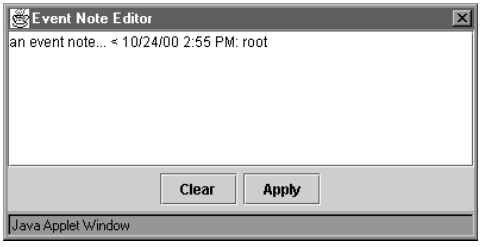
❖ *Adding or Editing Notes for an Event*

1. Click on an event in the Event Viewer to select it.
2. Choose **VIEW > NOTES**. An Event Note Editor dialog appears.



3. Enter the desired text.
4. Click **APPLY** to record the note or **CLEAR** to delete it.

The date, time, and username will be appended to the note when it is added to the Event Viewer.



Chapter 6 N-Spect Report Manager

ABOUT THIS CHAPTER

This chapter describes the N-Spect Report Manager.

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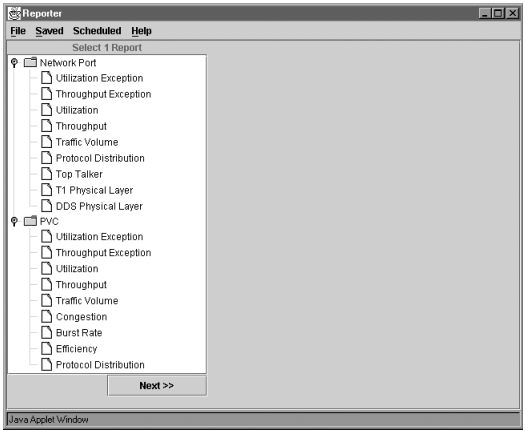
N-SPECT REPORT MANAGER

The N-Spect Report Manager is a historical trend analysis tool built around an intuitive graphical user interface. The Report Manager creates easy-to-read reports based on user selections. Reports can be created on demand or can be scheduled to be created automatically at regular intervals based on a 24-hour day, business day, calendar week, business week, calendar month, quarter, or calendar year. These scheduled reports are then published to the Generalized Reports section of the user's personalized web page.

N-Spect includes a comprehensive set of reports illustrating network trends. Reports include exception-based reporting, point-to-point performance monitoring, and many others. The resulting reports include a brief description on how to interpret the data and any graphs and/or tables. Reports are preserved in Adobe Acrobat PDF format, allowing for reduced file size and web posting.

❖ *Starting the N-Spect Report Manager*

1. Log on to your personal N-Form web site
2. Click the **REPORT MANAGER** button on the toolbar at the bottom of the screen. A Report Manager appears.



The Report Manager report selector panel shows the reports that are available. The individual reports are selected by expanding the folders in the report selector panel. As the user configures a report, new panels are added on the right side of the Reporter Manager. As new panels are added, the previously used panels are grayed and scroll off the left side of the window. The user may scroll or enlarge the window to see all the panels. At any point, select **Cancel** to return to the previous panel and modify your selections.

The N-Spect reports are grouped into two types: Network Port reports and PVC reports. At the top of each report is an explanation of the report and notes on key information to look for in the results and descriptions of the report's graphs or tables, as applicable.

NETWORK PORT REPORTS

Network Port Utilization Exception

The Utilization Exception report indicates when the average utilization of the network port exceeds an over-utilization threshold or falls below the under-utilization threshold for the transmit and receive directions. If the average consistently exceeds thresholds set, additional bandwidth may be necessary to prevent network bottlenecks. If devices consistently under-utilize the amount of bandwidth for the device, this bandwidth could be re-allocated in the network for more efficient use of overall bandwidth.

Network Port Throughput Exception

The Throughput Exception report indicates when the average throughput of the network port exceeds an over-utilization threshold or falls below the under-utilization threshold for the transmit and receive directions. If the average consistently exceeds thresholds set, additional bandwidth may be necessary to prevent network bottlenecks. If devices consistently under-utilize the amount of bandwidth for the device, this bandwidth could be

re-allocated in the network for more efficient use of overall bandwidth.

Network Port Utilization

The Network Port Utilization report indicates the average and maximum bandwidth utilized on the network port over the specified interval. Typically, the maximum utilization will be greater than the average utilization. If the difference between the average and maximum utilization is consistently small, and the average is relatively high, additional bandwidth may be necessary to prevent network bottlenecks.

Network Port Throughput

The Network Port Throughput report indicates the average and maximum bandwidth utilized on the network port over the specified interval. Typically, the maximum throughput will be greater than the average throughput. If the difference between the average and maximum throughput is consistently small, and the average is relatively high, additional bandwidth may be necessary to prevent network bottlenecks.

Network Port Traffic Volume

The Network Port Traffic Volume report indicates the amount of traffic present on the network port. The graphs show bytes and frames transmitted and received relative to the network port bandwidth.

Network Port Protocol Distribution

The Network Port Protocol Distribution Report indicates how the Layer 3 protocols are distributed over the entire network port. Graphs are shown for the transmit and receive direction. To drill down to an individual PVC, use the PVC Protocol Distribution report.

Network Port Top Talker

The Network Port Top Talker Report indicates the relative bandwidth utilization for each of the top users on the network port.

Network Port T1 Physical Layer

The T1 Physical Layer report indicates Errored Seconds and Severely Errored seconds as well as unavailable time for the network port. If the T1 line runs with errors, this could indicate a problem with the physical media.

Network Port DDS Physical Layer

The DDS Physical Layer report indicates Bipolar Violations and unavailable time for the DDS line. If the DDS line runs with errors, this could indicate a problem with the physical media.

PVC REPORTS

PVC Utilization Exception

The PVC Utilization Exception report indicates when the average utilization of one or more PVCs exceeds an over-utilization threshold or falls below the under-utilization threshold for the transmit and receive directions. If the average consistently exceeds the thresholds set, increasing the CIR may be necessary to prevent data from being lost. If the utilization of a PVC is consistently low, lowering the CIR may reduce network costs.

PVC Throughput Exception

The PVC Throughput Exception report indicates when the average throughput of one or more PVCs exceeds an over-utilization threshold or falls below the under-utilization threshold for the transmit and receive directions. If the average consistently exceeds the thresholds set, increasing the CIR may be necessary to

prevent data from being lost. If the throughput of a PVC is consistently low, lowering the CIR may reduce network costs.

PVC Utilization

The PVC Utilization report indicates the average and maximum bandwidth utilized on the selected PVC over the specified interval. Typically, the maximum utilization will be greater than the average utilization. If the difference between the average and maximum utilization is consistently small, increasing the CIR may be necessary to prevent network bottlenecks.

PVC Throughput

The PVC Throughput report indicates the average and maximum bandwidth utilized on the selected PVC over the specified interval. Typically, the maximum throughput will be greater than the average throughput. If the difference between the average and maximum throughput is consistently small, increasing the CIR may be necessary to prevent network bottlenecks.

PVC Traffic Volume

The PVC Traffic Volume report indicates the amount of traffic present on the selected PVC. The graphs show bytes and frames transmitted and received.

PVC Congestion

The PVC Congestion report details congestion in the network in both the transmit and receive directions. Congestion in the Frame Relay network when the throughput of the PVC is below the CIR may indicate a Service Level Agreement violation. Under normal conditions, congestion in the Frame Relay network should only occur when the throughput of the PVC exceeds the CIR.

PVC Burst Rate

The PVC Burst Rate report indicates the amount of time per interval that the PVC transmits or receives data at a rate above the CIR.

PVC Efficiency

The PVC Efficiency report displays how efficiently the PVC is operating by measuring round-trip delay and packet loss. If packets are being dropped in the network when the PVC throughput is below the CIR, the network may be congested.

PVC Protocol Distribution

The PVC Protocol Distribution Report indicates how the Layer 3 protocols are distributed over the selected PVC. Graphs are shown for the transmit and receive direction.

N-FORM DATA COLLECTION

To be included in a report generated by the Report Manager, a device must appear in the network tree (i.e., must currently be discovered) and the device must have data currently in the database (i.e., must have been collected).

The data collection process uploads the data stored internally in each device and stores that data in the N-Form database. Data collection occurs 1, 2, 3, 4, 6, 8, 12, or 24 times per day based on the individual device's buffer size and sampling rate. The internally stored buffer represents a fixed-size time window of data. This interval data is stored in the first-in-first-out buffer at a user-defined sampling rate. As new data is sampled and stored in the buffer, the oldest data ages out of the time window and is discarded. The amount of time it takes for a sampled interval to

enter the buffer and then be discarded may be calculated using the following formula:

Time Until Discard = # Samples In Buffer * Sample Period

N-Form schedules the number of collections per day so that the server has two opportunities to upload the data before it is discarded. Thus if one collection fails for some reason, such as network congestion, the data will still be in the device for the next collection opportunity. The number of times per day that N-Form collects data is calculated in the following way:

$$\text{Collections} = 2 * \frac{86400}{\text{Time Until Discard}}$$

The Collections value is rounded up to the nearest integer, and the resulting value is used to select the number of Collections per Day from the table below.

Collections <= 1	Collections per Day = 1
Collections <= 2	Collections per Day = 2
Collections <= 3	Collections per Day = 3
Collections <= 4	Collections per Day = 4
Collections <= 6	Collections per Day = 6
Collections <= 8	Collections per Day = 8
Collections <= 12	Collections per Day = 12

For example, consider a device configured with a 120 sample storage buffer and a sampling period of 5 minutes or 300 seconds. The time until data is discarded is,

Time Until Discard = 120 * 300 = 36000 seconds = 10 hrs.

The number of Collections per Day would be calculated as follows:

$$\text{Collections} = 2 * \frac{86400}{36000} = 4.8 \text{ which rounds up to } 5$$

Thus the number of Collections per Day from the table above would be six.

Collecting data at twice the rate that data is discarded from an individual device's buffer allows N-Form to provide the user with an additional level of data redundancy. At each collection, the timestamp at which the collection is completed is stored in the database. The next time data is collected from the device, only the data with timestamps newer than the last collection time will be collected and stored. The first time data is collected from a device, all the data in the device will be collected. Subsequent collections will only collect and store the new data in the device.

The first collection time each day occurs at midnight local time. This primary collection should complete data collection for the previous day. Scheduled reports are generated and the database is archived immediately after completion of primary collection. The start time of primary collection can be changed by providing an offset from the default time (see *Chapter 7, N-Form Administration*). The offset is contained in the environmental variable NFORM_COLLECT_OFFSET. The value of the offset is seconds from midnight and must have a value between +/- 86400. The default value is zero. The offset may be entered in the following formats: seconds, MM:SS, HH:MM:SS (e.g. 3600, 60:00, 01:00:00 all represent 1 AM local time).

The other collection times during the day are relative to the primary collection time. For example, if the primary collection time is 1 AM, then a device which is collected four times a day will be collected at 1 AM, 7 AM, 1 PM, and 7 PM.

The total collection time for each device is limited to one hour. If the collection is not completed within this time, collection will

cease for that device until the next collection time arrives. This time limit prevents a slow segment of the network from tying up the collection resources and causing data to be lost in responsive segments due to being deleted from the buffers before being collected.

The timestamps stored in the devices are based on the device's internal clock. As the data is stored in the database, an offset is added to compensate for differences between the device's local time and the N-Form server's local time, and the resulting timestamps are converted to Coordinated Universal Time (UTC). This offset compensates for devices that are in different time zones and for the effects of Daylight Savings time. The offset also compensates for devices on which the internal clock is incorrectly set; however, it is advantageous to ensure that each device's clock is set correctly when the device is configured.

To speed the data collection process, data may be collected simultaneously from multiple devices. The number of simultaneous collections is set by the Server Administration Tool and is discussed in *Chapter 7, N-Form Administration*. The default value is 16 and the valid range is 1 to 96. However, adding additional simultaneous collections also increases the amount of network bandwidth consumed by the collection process. There will be some point beyond which the additional network traffic caused by adding additional collections will offset any speed gain.

DATA ARCHIVING AND ROLLUP

Data is stored internally in each device at some device specific interval, typically 5 to 30 minutes. This raw data, referred to here as interval data, from the device is collected by the N-Form server and stored in the database. As the data ages and becomes less relevant, the interval data is archived or rolled up into larger intervals in order to decrease the amount of data which must be stored.

Typically, the highest frequency data is stored for 30 days. On the 31st day, this oldest interval data is rolled up from interval to

hourly data. For example, if the device data is stored at 5 minute intervals, then there will 12 datapoints in each hourly interval. Eventually this hourly data will be rolled up to daily data. After one year daily data is discarded from the database.

The process by which the data is rolled up is dependent on the specific type of data being manipulated. The available rollup options are shown in the table below.

Rollup Type	Each rollup value takes the value of the...
SUM	Sum of all values within each rollup interval
AVG	Average of all values within each rollup interval
MAX	Maximum value within each rollup interval
MIN	Minimum value within each rollup interval
TIME	Start time of the rollup interval
NONE	Last datapoint in the rollup interval

The report manager uses the same logic to manipulate the data for each report, with the additional rollup intervals of days to weeks, weeks to months, and months to quarters.

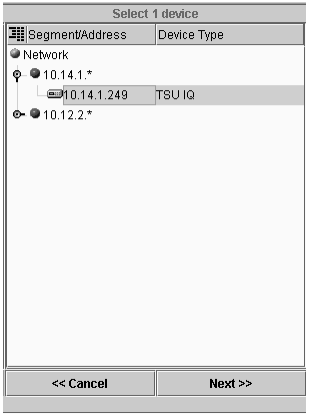
The report manager produces the reports using the data stored in the database. Therefore the rollup or archiving of the database has a bearing on the data resolution available for reporting. Data may be rolled up from higher frequency data to lower frequency, but is not interpolated from lower frequency data to higher frequency. Therefore a yearly report cannot be created with only interval data, because only 30 days of interval data are stored in the database. The available report intervals and corresponding data resolutions are shown below. All times are referenced to N-Form Server local time.

Interval	Definition	Data Resolution
24 Hour Day	24 Hour Day	Interval, Hourly
Business Day	8AM - 5PM server local time	Interval, Hourly
Calendar Week	Sunday through Saturday	Hourly, Daily
Business Week	Monday - Friday 24 hr days	Hourly, Daily
Month	1 Calendar Month	Daily, Weekly
Quarter	3 Calendar Months (beginning January - March)	Daily, Weekly
Year	12 Calendar Months (beginning January)	Weekly, Monthly

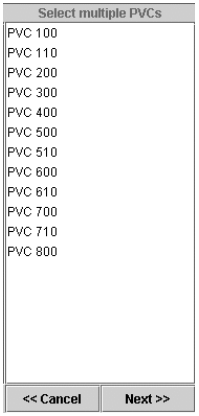
❖ *Generating an Immediate Report*

1. Start the Report Manager.
2. Select a report from the list of available reports displayed in the Report Selector panel. The Device Selector panel becomes visible on the right.

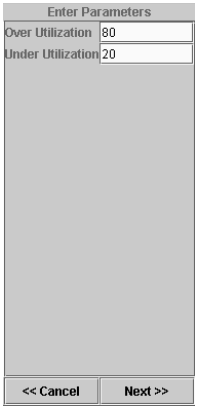
   The Device Selector panel displays an abbreviated copy of the network map. Only devices that have data in the database and are applicable for the type of report chosen appear in the network map in the Device Selector panel.



3. Select the desired device from the Network Map in the Device Selector panel and click **NEXT**. If this is a PVC report, the PVC Selector panel appears.

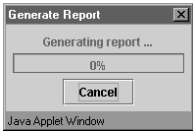


4. If the PVC Selector panel is displayed, select the desired PVCs and click **NEXT**. If the report requires user-defined parameters such as those required for the exception reports, the Report Parameters panel appears.



5. If the Report Parameters panel is displayed, enter any user-definable parameters such as **OVER UTILIZATION PERCENTAGE** and click **NEXT**. The Interval selector panel appears.

6. Select the **GENERATE NOW** tab to generate a report that is immediately available for viewing.
7. Select the **DESIRED INTERVAL** and **DATA RESOLUTION** from the drop down menus.
8. Select the desired date from the calendar by choosing the month or quarter and year and clicking on the calendar to select the day or week.
9. Click **GENERATE REPORT**. The Building Report dialog will appear.

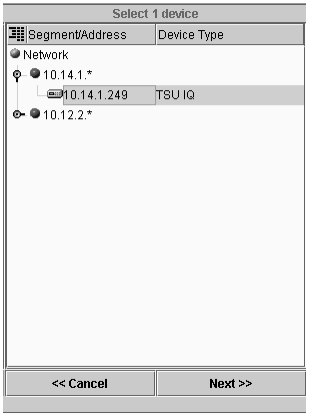


When the report is completed, it will open in a new browser window using the Acrobat plugin. The user may then save the report as a PDF file or print the report using the Acrobat plugin.

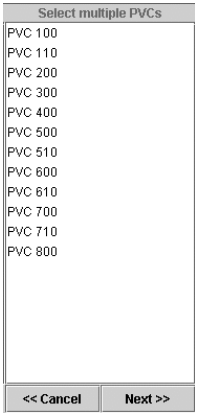
❖ *Scheduling a Report*

1. Start the Report Manager.
2. Select a report from the list of available reports displayed in the Report Selector panel.

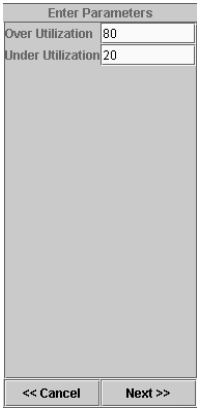
The Device Selector panel becomes visible on the right and displays an abbreviated copy of the network map. Only devices that have data in the database and are applicable for the type of report chosen appear in the network map in the Device Selector panel.



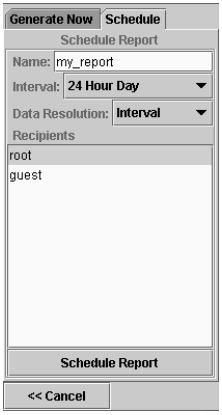
3. Select the desired device from the Network Map in the Device Selector panel and click **NEXT**. If this is a PVC report, the PVC Selector panel appears.



4. If the PVC Selector panel is displayed, select the desired PVCs and click **NEXT**. If the report requires user-defined parameters such as those required for the exception reports, the Report Parameters panel appears.



5. If the Report Parameters panel is displayed, enter any user-definable parameters such as **OVER UTILIZATION PERCENTAGE** and click **NEXT**. The Interval selector panel appears.



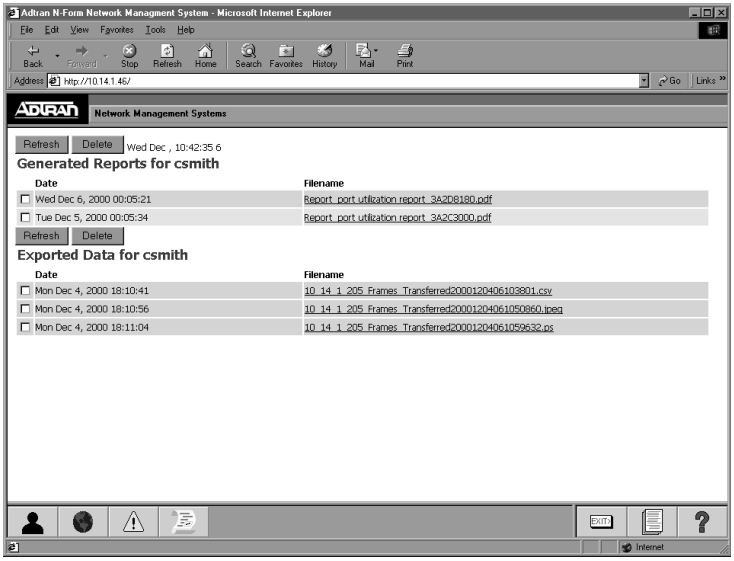
6. Select the **SCHEDULE** tab to generate a report that will automatically be created repeatedly at a specified interval.
7. Enter a **NAME** for the report.
8. Select the **DESIRED INTERVAL** and **DATA RESOLUTION** from the drop down menus.
9. Select the desired receivers from the **RECEIVERS** list. Select multiple receivers by holding down the **Shift** key to select a

continuous range of receivers or holding down the **Control** key to select individual receivers.

10. Click **SCHEDULE REPORT**. The Report Scheduled dialog appears.

11. Click **OK**.

The selected report is now scheduled and will automatically be generated at the selected interval. Scheduled reports are generated each day following the primary data collection time which is, by default, midnight local time for the N-Form server. After the report is generated, a PDF version of the report is posted to the Generated Reports section of the personal web page of each user in the report's receiver list as shown below. These reports are accessed by clicking on the report title hyperlink which opens the report in a client browser window using the Adobe Acrobat plugin. The report may be saved or printed using the Acrobat plugin.

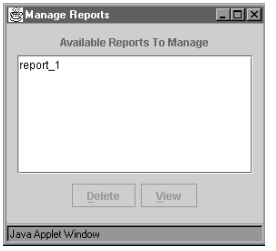

Adtran N-Form Network Managment System - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print
Address http://10.14.1.46/
Go Links
ADTRAN Network Management Systems
Refresh Delete Wed Dec , 10:42:35 6
Generated Reports for csmith
Date Filename
Wed Dec 6, 2000 00:05:21 Report_port utilization report_3A2D8180.pdf
Tue Dec 5, 2000 00:05:34 Report_port utilization report_3A2C3000.pdf
Refresh Delete
Exported Data for csmith
Date Filename
Mon Dec 4, 2000 18:10:41 10_14_1_205_Frames_Transferred20001204061038O1.csv
Mon Dec 4, 2000 18:10:56 10_14_1_205_Frames_Transferred20001204061050860.jpeg
Mon Dec 4, 2000 18:11:04 10_14_1_205_Frames_Transferred20001204061059532.ps
EXIT
Internet

❖ *Deleting a Report from the Personal Web Page*

1. Log in to your personal web page.
2. Click the check box on the left to select the desired reports.
3. Click **DELETE**.

❖ *Viewing/Deleting a Scheduled Report*

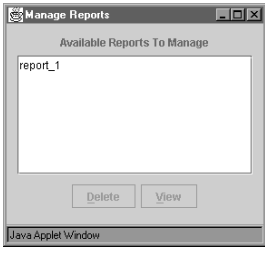
1. Start the Reporter.
2. Select **SCHEDULED > SCHEDULED REPORTS**. The Manage Reports dialog appears. This dialog shows a list of available reports to manage.



3. Select the desired report from the list.
4. Click **VIEW** to view the fully expanded report configuration in a Report Manager, or click **DELETE** to delete the report configuration and unschedule the report.

❖ *Editing a Scheduled Report*

1. Start the Reporter.
2. Select **SCHEDULED > SCHEDULED REPORTS**. The Manage Reports dialog appears. This dialog shows a list of available reports to manage.



3. Select the desired report from the list.
4. Click **VIEW**. The report will appear fully expanded in the Report Manager.
5. Select the report in the Manage Reports dialog and click **DELETE**.
6. Navigate in the Reporter window and make the desired changes
7. Click **SCHEDULE REPORT** to reschedule the updated report.

Chapter 7 N-Form Administration

ABOUT THIS CHAPTER

This chapter describes the N-Form configuration parameters and Administration Tools.

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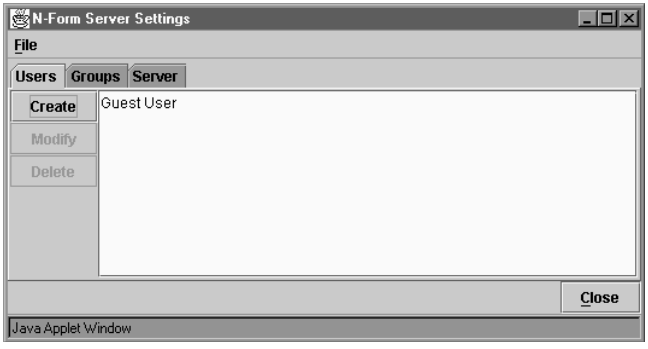
N-FORM ADMINISTRATION TOOL

N-Form contains administration tools for managing users, passwords, groups, and server configuration parameters. Each N-Form user account has a password and account privileges which control access to N-Form modules. Each user has their own personalized web site on which to view their scheduled reports and saved charts and data. Groups simplify report and data distribution by allowing information to be sent to a number of users by selecting only a single group as the receiver.

A user must use the 'root' administrator account or another account with All Areas access privileges to use the administration tools.

❖ *Starting the N-Form Administration Tool*

1. Log on to your personal N-Form web site.
2. Click the **ADMINISTRATION TOOL** button on the toolbar at the bottom of the screen. An N-Form Server Administrator appears.



The Server Administrator has three tabs across the top of the window: **USERS, GROUPS** and **SERVER**. These tabs are used to access each type of administrative function. The **USERS** tab displays the tools used to create, modify, and delete users. The **GROUP** tab displays the tools used to create, modify, and delete groups.The **SERVER** tab displays the tools used to configure

parameters controlling the default SNMP settings, network utilization, email configuration, event history log configuration, and network event notification.

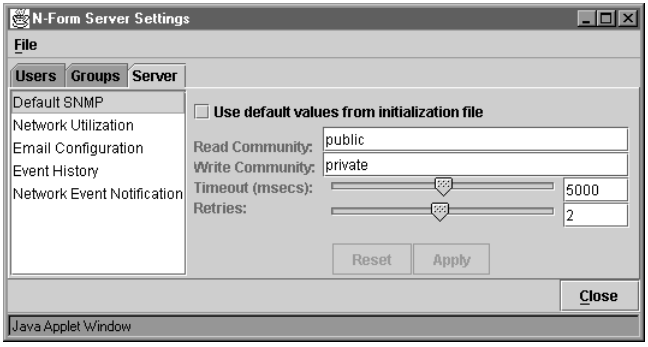
DEFAULT SNMP PARAMETERS

SNMP Read Community & SNMP Write Community

These parameters specify the default SNMP read and write communities. The parameters are of type String. SNMP Read Community has a default value of “public” and SNMP Write Community has a default value of “private”.

❖ *Changing SNMP Read Community & SNMP Write Community Parameters*

1. Start an N-Form Server Administrator.
2. Select the **SERVER** Tab.



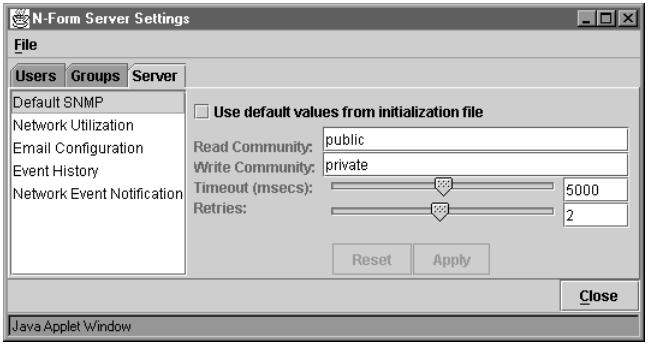
3. Click **DEFAULT SNMP** in the left server settings selector panel.
4. Type the desired string in the space provided, or click the check box to use the values from the initialization file
5. Click **APPLY** to save the new setting or **RESET** to restore the previous values.
6. Click **CLOSE**.

SNMP Timeout

The SNMP Timeout parameter specifies the default time in milliseconds N-Form will wait for a response from SNMP or discovery. This parameter is of type Integer and has a default value of 5000.

❖ *Changing SNMP Timeout Parameter*

1. Start an N-Form Server Administrator.
2. Select the **SERVER** Tab.



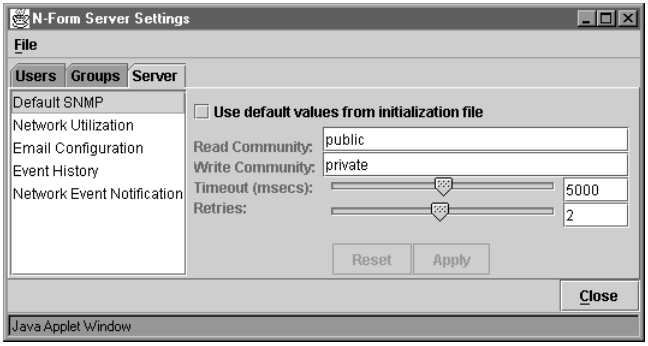
3. Click **DEFAULT SNMP** in the left server settings selector panel.
4. Drag the slider to set the timeout value or type a value in the box provided. Click the check box to use the value from the initialization file.
5. Click **APPLY** to save the new setting or **RESET** to restore the previous value.
6. Click **CLOSE**.

SNMP Retries

The SNMP Retries parameter specifies the default number of retries for SNMP and discovery requests. This parameter is of type Integer and has a default value of 2.

❖ *Changing SNMP Retries Parameter*

1. Start an N-Form Server Administrator.
2. Select the **SERVER** Tab.



3. Click **DEFAULT SNMP** in the left server settings selector panel.
4. Drag the slider to set the retries value or type a value in the box provided. Click the check box to use the value from the initialization file.
5. Click **APPLY** to save the new setting or **RESET** to restore the previous value.
6. Click **CLOSE**.

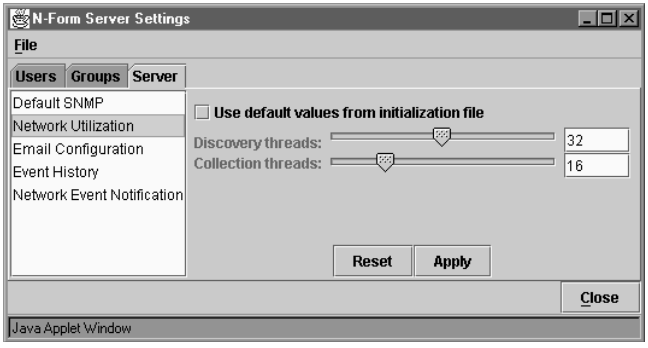
DISCOVERY PARAMETERS

Discovery Threads

The Discovery Threads parameter specifies the number of separate threads to use for device discovery. Specifying multiple threads for discovery speeds the discovery process by allowing multiple devices to be discovered simultaneously. This parameter is of type Integer and has a default value of 32. The valid range is 1 to 64. However, adding additional simultaneous discoveries also increases the amount of network bandwidth consumed by the discovery process. There will be some point beyond which the additional network traffic caused by adding additional discoveries will offset any speed gain.

❖ *Changing Discovery Threads Parameter*

1. Start an N-Form Server Administrator.
2. Select the **SERVER** Tab.



3. Click **NETWORK UTILIZATION** in the left Server Settings selector panel.
4. Drag the slider to set the number of simultaneous devices to discover, or click the check box to use the values from the initialization file.
5. Click **APPLY**.
6. Click **CLOSE**.

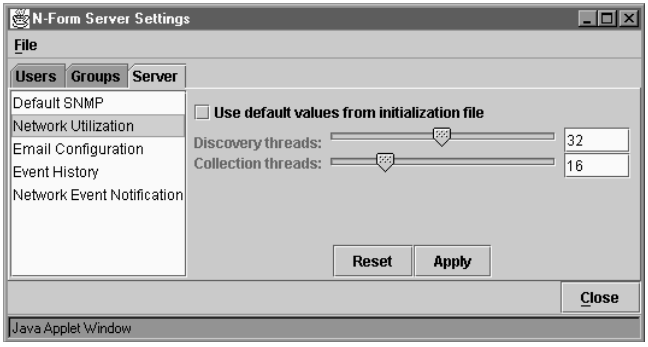
DATA COLLECTION PARAMETERS

Collection Threads

The Collection Threads parameter specifies the number of separate threads to use for device data collection. Specifying multiple threads for collection speeds the collection process by allowing data from multiple devices to be collected simultaneously. This parameter is of type Integer and has a default value of 16. The valid range is 1 to 96. However, adding additional simultaneous collection threads also increases the amount of network bandwidth consumed by the collection process. There will be some point beyond which the additional network traffic caused by adding additional collections will offset any speed gain.

❖ *Changing the Collection Threads parameter*

1. Start an N-Form Server Administrator.
2. Select the **SERVER** Tab. The Server Settings dialog appears.



3. Click **NETWORK UTILIZATION** in the left Server Settings selector panel.
4. Drag the slider to set the number of simultaneous devices to collect or click the check box to use the values from the initialization file.
5. Click **APPLY** to save the new setting or **RESET** to restore the previous value.
6. Click **CLOSE**.

Collection Offset

The Collection Offset parameter specifies the offset from the default primary data collection time of midnight server local time. This parameter is of type String and the value of the offset is seconds from midnight and must have a value between +/- 86400. The default value is “0”. The offset may be entered in the following formats: seconds, MM:SS, HH:MM:SS (e.g., 3600, 60:00, 01:00:00 all represent 1 AM local time). Collection Offset may be specified as a system environment variable or an entry in the initialization file.

❖ *Changing the Collection Offset parameter*

1a. Change the value of the Windows NT system environment variable NFORM_COLLECT_OFFSET to the desired value.

Alternately...

1b. Edit the offset entry in the collection section of the initialization file prior to starting the N-Form server.

[collection]
offset = *value*

See *Appendix B, N-Form Parameters* for more information on setting the Collection Offset parameter

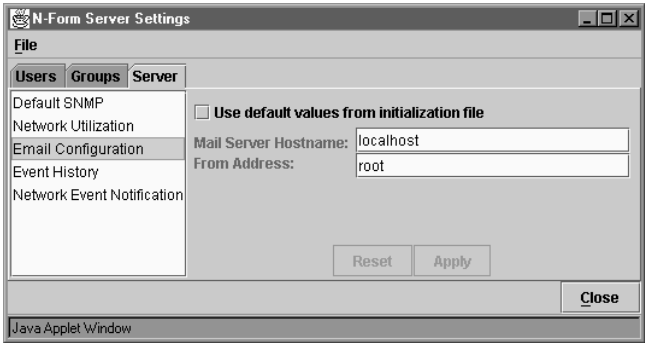
EMAIL PARAMETERS

EMail Server Hostname

The EMail Server Hostname parameter specifies the name of the mail server used by the N-Form server to send email. Email notification is dependent on the network's local mail server. Some servers are configured to send email only inside their local domain, and N-Form event notification would therefore have this same limitation. This parameter is of type String and the default value is "localhost".

❖ *Configuring the EMail Server Hostname parameter*

1. Start an N-Form Server Administrator.
2. Select the **SERVER** Tab. The Server Settings dialog appears.



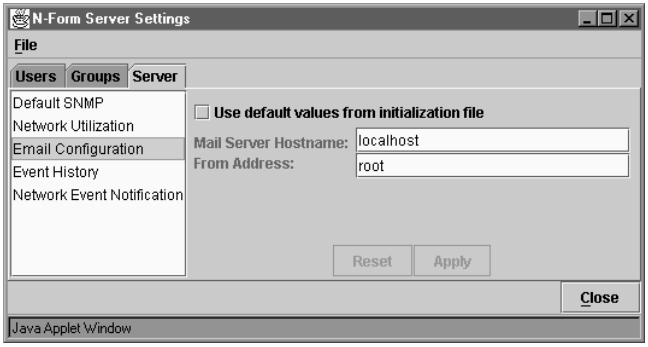
3. Click **EMAIL CONFIGURATION** in the left Server Settings selector panel.
4. Enter **MAIL SERVER HOSTNAME** or click the checkbox to use the values from the initialization file.
5. Click **APPLY** to save the new setting or **RESET** to restore the previous value.
6. Click **CLOSE**.

EMail From Address

The EMail From Address parameter specifies a valid email account username for the N-Form server on the mail server used to send email. This parameter is of type String and the default value is “root”.

❖ *Configuring the EMail From Address parameter*

1. Start an N-Form Server Administrator.
2. Select the **SERVER** tab. The Server Settings dialog appears.



3. Click **EMAIL CONFIGURATION** in the left Server Settings selector panel.
4. Enter **FROM ADDRESS**.
5. Click **APPLY** to save the new setting or **RESET** to restore the previous value.
6. Click **CLOSE**.

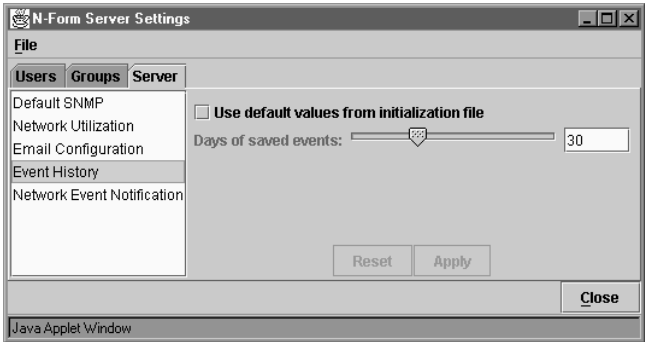
EVENT LOG PARAMETERS

Days of Saved Events

The Days of Saved Events parameter specifies the number of days system events are stored in the database before being discarded. This parameter is of type Integer and has a default value of 30 days. The valid range is 1 to 90 days.

❖ *Configuring the Days of Saved Events parameter*

1. Start an N-Form Server Administrator.
2. Select the **SERVER** Tab. The Server Settings dialog appears.



3. Click **EVENT HISTORY** in the left Server Settings selector panel.
4. Drag the slider to set the number of days to keep network event history, or click the check box to use the values from the initialization file.
5. Click **APPLY** to save the new setting or **RESET** to restore the previous value.
6. Click **CLOSE**.

NETWORK EVENT NOTIFICATION

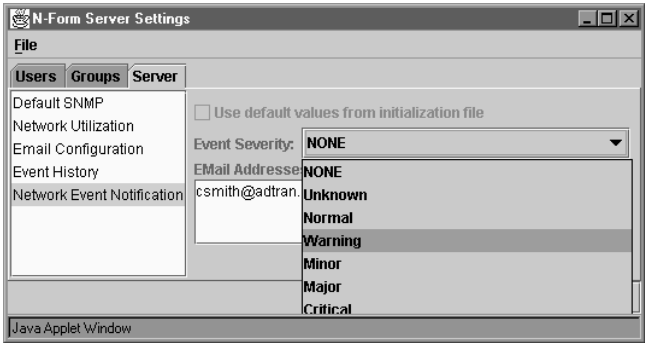
This panel configures the N-Form server to notify specified users via email when network level events are encountered. Event notification for network level events can only be configured with the Administration Tool. Event notification for nodes and individual devices is configured in the Network Manager (see *Chapter 3, N-Command Network Manager*).

Event notification severity falls through to each higher level of criticality. For example, a user who receives minor severity events would also be notified of events of major and critical severity, but a user who only receives critical severity events would not be notified of events with lesser severity.

Email notification is dependent on the network's local mail server. Some servers are configured such that they cannot send email outside their local domain, and N-Form event notification would therefore have the same limitation. The N-Form email server configuration is discussed above.

❖ *Configuring Network Event Notification*

1. Start an N-Form Server Administrator.
2. Select the **SERVER** Tab. The Server Settings dialog appears.



3. Select the notification **EVENT SEVERITY** level from the drop down menu:

   NONE
   UNKNOWN
   NORMAL
   WARNING
   MINOR
   MAJOR
   CRITICAL

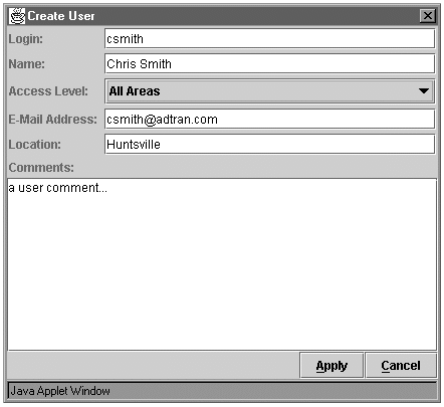
4. Enter valid **EMAIL ADDRESSES** in the panel below the severity menu.

These email addresses can be in any form accepted by the local mail server. In addition to the typical user@domain form, some email servers are set up to accept just the username or other aliases to represent users and groups of users.

5. Click **APPLY** to save the new values or **RESET** to restore the previous values.

❖ *Creating a User*

1. Start an N-Form Server Administrator.
2. Select the **USERS** tab.
3. Click **CREATE**. The Create User dialog appears.



4. Enter user information. User information consists of:

LOGIN	unique login name	required
NAME	user's name	optional
EMAIL ADDRESS	user's email address	optional
LOCATION	user's physical location	optional
COMMENTS	notes	optional

5. Choose user **ACCESS LEVEL** from the drop down menu:

PERSONAL SETTINGS ONLY - allows access only to User Settings Tool

NO REPORT GENERATION OR ADMINISTRATION - adds access to Network Manager, Element Manager, and Event manager to the privileges above

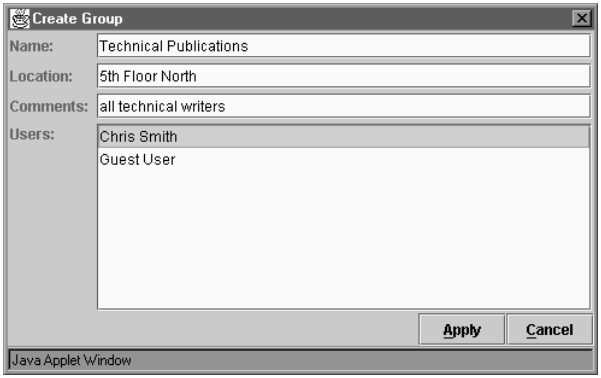
NO ADMINISTRATION - adds access to the N-Spect Report Manager to the privileges above

ALL AREAS - allows full access to all N-Form modules including Administration Tool

6. Click **APPLY** to create the user with default password "password" and return to the Server Administrator, or click **CANCEL** to discard changes and return to the Server Administrator.

❖ *Creating a Group*

1. Start an N-Form Server Administrator.
2. Select the **GROUP** Tab.
3. Click **CREATE**. The Create Group dialog appears.



4. Enter group information. Group information consists of:

NAME	group name	required
LOCATION	group's physical location	optional
COMMENTS	notes	optional

5. Select the members of the group from the list of previously configured users.
6. Click **APPLY** to create the Group and return to the Server Administrator or click **CLOSE** to discard changes and return to the Server Administrator.

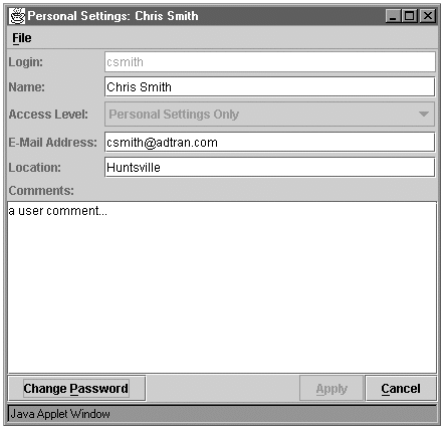
❖ *Deleting a User or Group*

1. Start an N-Form Server Administrator.
2. Select the **USERS OR GROUP** Tab.
3. Select a user or group.
4. Click **DELETE**.

N-FORM USER SETTINGS

❖ *Starting the N-Form User Settings Tool*

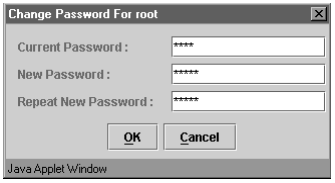
1. Log on to your personal N-Form web site.
2. Click the **USER SETTINGS** button on the toolbar at the bottom of the screen. A User Settings Tool appears.



The Users Administrator is used to update user information including name, email address, location, user comments, and password.

❖ *Changing a Password*

1. Start an N-Form User Settings Tool.
2. Click **CHANGE PASSWORD**. The Change Password dialog appears.



3. Enter the **OLD PASSWORD**.
4. Enter and verify the **NEW PASSWORD**.
5. Click OK to set the **NEW PASSWORD** or **CANCEL** to exit and leave the password unchanged.

Appendix A Supported Products

The N-Form software suite currently supports the following products. Future releases will continue to add other ADTRAN product families.

- DSU IQ - 1200212L1
  56/64K Frame Relay Monitoring DSU
- TSU IQ - 1200215L1
  T1/FT1 Frame Relay Monitoring DSU
- NxIQ - 1200255L1
  Frame Relay Nx port for TSU Multiplexers
- TSU IQ+ - 1200275L1
  T1/FT1 DSU with DSX-1 port with Frame Relay Monitoring
- TSU IQ Rackmount - 1200277L1
  Rackmounted T1/FT1 Frame Relay monitoring DSU
- IQ Probe - 1200214L1
  In-line unit supports rates of 56K to 2M
- Atlas 800^{PLUS} - 4200226L1
  Supports 6M of Frame Relay
- TSU 100e - 1202052L1
  Modular T1/FT1 DSU/CSU with V.35 and one option slot
- TSU 120e - 1202129L1
  Modular T1/FT1 DSU/CSU with integral V.35 DTE and DSX-1 ports and one option slot
- TSU 600e - 1202076L1
  Modular T1/FT1 DSU/CSU with 6 option slots

Appendix B N-Form Parameters

The default N-Form parameters should be adequate to allow N-Form to work on most networks. However, these parameters may be modified to configure N-Form behavior for a specific environment. If you have any question about a parameter, please contact ADTRAN Technical Support before modifying its value.

TYPES

The parameters that control the operation of N-Form have seven distinct type definitions. These type definitions and example values are listed below.

Boolean	=	True, False, T, F, Yes, No, Y, N
Flag	=	True, False, T, F, Yes, No, Y, N (on command line, existence implies True)
Integer	=	Integer value in decimal, hexadecimal, octal, or binary format (e.g., 23 or 0d23, 0x17, 0o27, 0b10111)
Float	=	standard floating point number (e.g., 1, 1.0, 1.0e6)
String	=	Single word or quoted string (e.g., User, "This user manual is for you")
Path	=	Same as string, but may be relative to another path specific to each variable.
Enum	=	Enumerated list of values (strings) specific to each variable (e.g., Top, Left, Right, Bottom)

A path type parameter may be relative to some other fixed location. For example, all the N-Form component directory locations are relative to the N-Form installation directory. An absolute path begins with a forward or backward slash (e.g., "/N-Form") or contains a colon (e.g, "C:/Program Files/Adtran/N-Form"). The path parameters and their relative dependencies are listed below.

RELATIVE PATH DEPENDENCIES

Path	Relative to…
InstallDir	None
BinDir	InstallDir
LogsDir	InstallDir
DataDir	InstallDir
IniFile	InstallDir
WebDir	InstallDir
UserDir	InstallDir
DataBasePath	InstallDir
DataBaseEngine	InstallDir
JarDir	WebDir

The N-Form Parameters are shown in the table below.

Name	Type	Default Value	Definition
UserDir	Boolean	data	The path from the N-Form web root directory to the user data directory.
EMailFrom	String	root	The username of the N-Form server in the email system (for from and security).
EMailServer	String	localhost	The email server to which to send Event notices.
CollectionBarrels	Integer	16	The number of threads allowed for the server to use during collection (1-96).
CollectionOffset	String	0	Start of collection time offset in seconds from midnight (local time).
JarDir	Flag	jars	The path from the N-Form web root directory to the java archives directory.
ReinitializeService	Flag	FALSE	Force N-Form service to reload configuration files.('=' not needed)
StopService	Flag	FALSE	Stops the registered NT service.('=' not needed)
StartService	Flag	FALSE	Starts the registered NT service.('=' not needed)
UnregisterService	Flag	FALSE	Removes N-Form from the NT services registry.('=' not needed)
RegisterService	Flag	FALSE	Registers N-Form as an NT service.
RunInShell	Flag	FALSE	To run from the command line. ('=' not needed)
DataBaseEngine	Path	Sybase/win32/dbeng7	The pathname of the Sybase engine
DataBasePath	Path	.	The path to the Sybase database
TrapDays	Integer	30	The number of days before traps are automatically deleted.

Name	Type	Default Value	Definition
PollFreq	Integer	5	The time in minutes between discovered node status checks.
SNMPRetries	Integer	2	The number of retries for SNMP and discovery requests.
SNMPTimeout	Integer	5000	The time in milliseconds to wait for response from SNMP or discovery.
SNMPWrite	String	private	The SNMP write community string.
SNMPRead	String	public	The SNMP community string.
PingFailureThreshold	Integer	2	The minimum consecutive ping failures that will generate a trap.
DiscoveryBarrels	Integer	32	The number of threads allowed for the server to use during discovery (1-64).
WebDir	Path	Apache/htdocs/nform	Location of N-Form web directory.
NotifyLogLevel	Integer	48	The detail level of information being logged to a notification procedure such as the NT event log.
EchoLogLevel	Integer	60	The detail level of information being displayed in shell output.
LogLevel	Integer	60	The detail level of information being written in the log file.
PrintHelp	Flag	FALSE	Displays this information. ('=' not needed)
LoggerControl	Boolean	TRUE	'TRUE' enables information logging. 'FALSE' disables the logging.
IniFile	Path	N-Form.ini	The pathname from the installation directory to the initialization file.
DataDir	Path	Data	The path from the installation directory to the data directory.
LogsDir	Path	logs	The path from the installation directory to the logs directory.
BinDir	Path	bin	The path from the installation directory to the executables directory.
InstallDir	Path	/N-Form	The path for the N-Form product installation.

CONFIGURING PARAMETER VALUES

In addition to a default value, each N-Form parameter may be specified by one or more of the methods listed below. If the parameter may be specified by more than one method, the precedence is enforced as shown.

Precedence (highest to lowest)

Admin	value specified by Administration Tool (see *Chapter 7, N-Form Administration*)
ENV	value specified as Windows NT system environmental variable
INI	value specified in initialization file
Default	default value

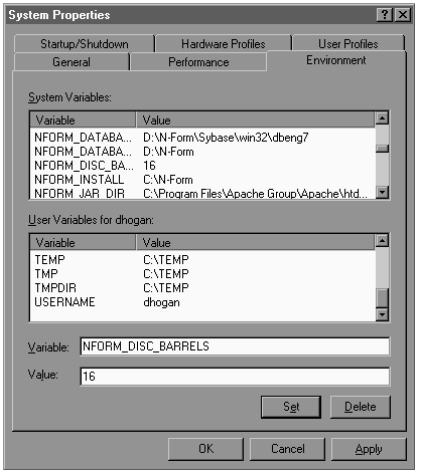
The table below lists the environmental variable names and entries from the initialization file used to set each of the N-Form parameters.

Name	ENV	INI
UserDir	NFORM_USER_DIR	directory.users
EMailFrom	NFORM_EMAIL_FROM	email.from
EMailServer	NFORM_EMAIL_SERVER	email.server
CollectionBarrels	NFORM_COLLECT_BARRELS	collection.barrels
CollectionOffset	NFORM_COLLECT_OFFSET	collection.offset
JarDir	NFORM_JAR_DIR	directory.jars
ReinitializeService		
StopService		
StartService		
UnregisterService		
RegisterService		
RunInShell		
DataBaseEngine	NFORM_DATABASE_ENGINE	database.engine
DataBasePath	NFORM_DATABASE_PATH	database.path
TrapDays	NFORM_TRAP_DAYS	traps.days
PollFreq	NFORM_POLL_FREQUENCY	statuspoller.frequency

Name	ENV	INI
SNMPRetries	NFORM_SNMP_RETRIES	snmp.retries
SNMPTimeout	NFORM_SNMP_TIMEOUT	snmp.timeout
SNMPWrite	NFORM_SNMP_WRITE	snmp.write_community
SNMPRead	NFORM_SNMP_READ	snmp.read_community
PingFailureThreshold	NFORM_PING_THRESHOLD	
DiscoveryBarrels	NFORM_DISC_BARRELS	discovery.barrels
NFormWebDir	NFORM_WEB_DIR	
NotifyLogLevel	NFORM_NOTIFY_LEVEL	
EchoLogLevel	NFORM_ECHO_LEVEL	
LogLevel	NFORM_LOG_LEVEL	
PrintHelp		
LoggerControl		logger.enabled
IniFile	NFORM_INI	
DataDir	NFORM_DATA_DIR	directory.data
LogsDir	NFORM_LOGS_DIR	directory.logs
BinDir	NFORM_BIN_DIR	directory.bin
InstallDir	NFORM_INSTALL	directory.install

❖ *To change parameters with Windows NT system environment variables*

1. Open the System Properties by starting **START MENU > SETTINGS > CONTROL PANEL > SYSTEM** and clicking the **ENVIRONMENT** tab.



2. Select the desired parameter from the list of System Variables and change the value in the **VALUE** box at the bottom of the window.
3. Click **SET** to apply changes and **OK** to exit.

For example, to change the number of discovery threads to 16 using the environment variable, change the NFORM_DISC_BARRELS variable as shown above.

❖ *To change parameters with the initialization file*

1. Open the N-Form initialization file, N-Form.ini, located in the N-Form installation directory
2. Edit the desired parameter entry in the corresponding section of the initialization file prior to starting the N-Form server.

[*section*]

parameter = value

For example, to change the number of discovery threads to 16 using the initialization file, change the barrels entry in the discovery section as shown below.